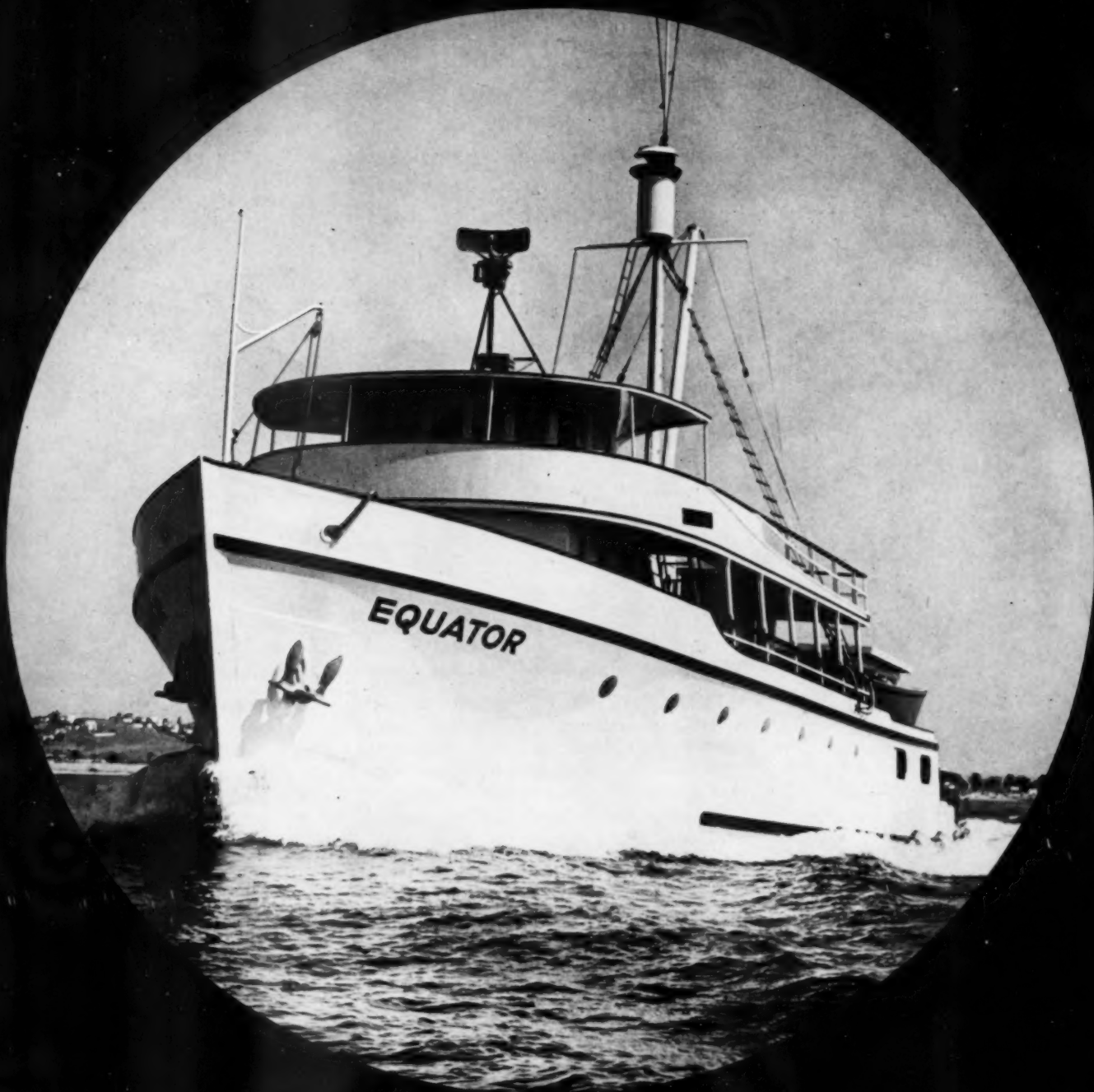


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

# DIESEL PROGRESS



FIVE DOLLARS PER YEAR

MARCH, 1952

FIFTY CENTS PER COPY

# REDUCE CYLINDER REGARDLESS OF FUEL



keep  
your engines running  
by using **TEXACO URSA**

Whether you're using Diesel, gas or dual-fuel engines, *Texaco Ursa Oil* will give them extra protection against wear, will keep your maintenance costs and fuel consumption at an absolute minimum.

*Texaco Ursa Oil* has extra resistance to oxidation. This means freedom from power-

stealing carbon, gum and sludge formations . . . means free rings, clear ports . . . valves that function freely and seat properly. You get proper compression and combustion . . . full power with less fuel used.

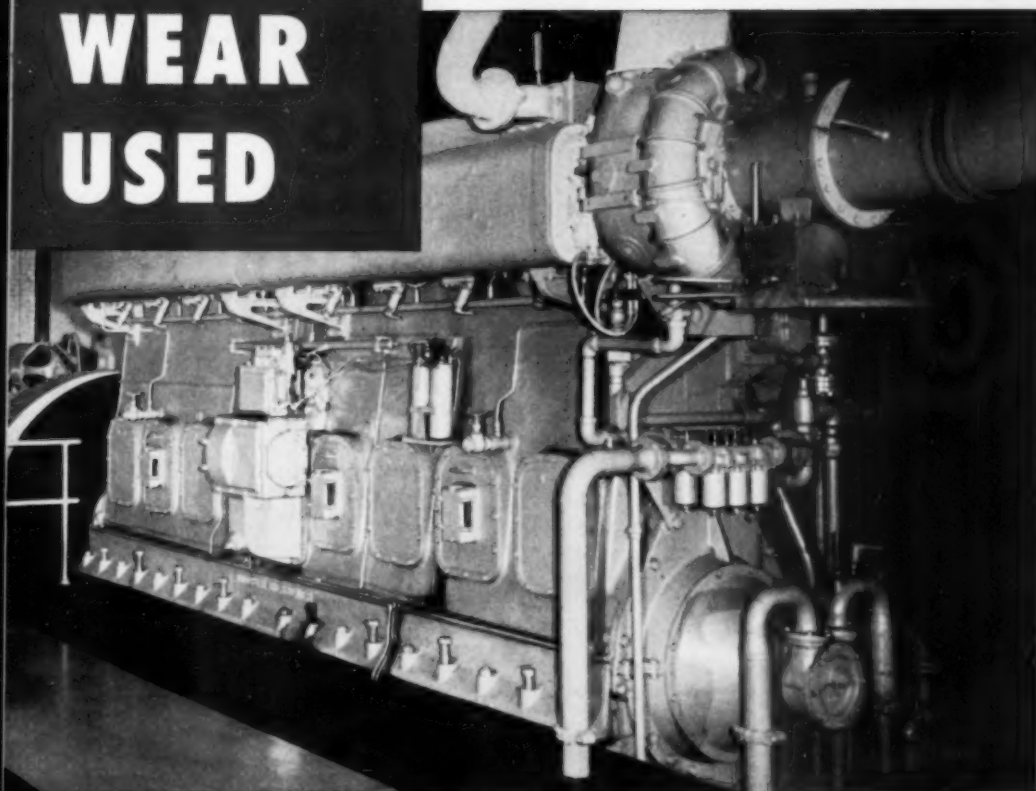
Maintenance costs come down, too, because *Texaco Ursa Oil* stands up under heat

**TUNE IN . . . TEXACO**  
STAR THEATER  
starring MILTON BERLE  
on television  
every Tuesday night.  
METROPOLITAN OPERA  
radio broadcasts every  
Saturday afternoon.



# TEXACO

**WEAR  
USED**



**clean  
OIL**

size of Diesel engine. Noteworthy, too, is this fact —

*For over 15 years, more stationary Diesel h. p. in the U. S. has been lubricated with Texaco Ursa Oil than with any other brand.*

and pressure . . . keeps engines clean . . . guards against wear. Fewer repairs and overhauls are necessary . . . bearings, pistons and liners all last longer.

Leading engine builders approve *Texaco Ursa Oils*, and there is a complete line to assure best performance from every type and

Call in a Texaco Lubrication Engineer. Let him help you step up your engine performance and bring down your costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

**URSA OILS FOR ALL DIESEL, GAS  
AND DUAL-FUEL ENGINES**



For **QUIET** compressor intakes and engine exhausts...



**TOWBOAT**

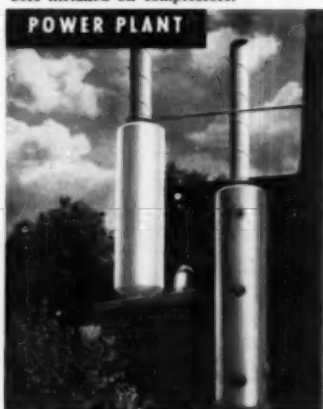
Towboat "AETNA-LOUISVILLE" equipped with six Burgess-Manning Snubbers.

*Choose*  
**BURGESS-  
MANNING  
SNUBBERS**



**MANUFACTURING PLANT**

Burgess-Manning Gas and Air Line Snubbers installed on compressors.



**POWER PLANT**

Michigan Diesel-electric power plant, equipped with Burgess-Manning Snubbers.



**DIESEL LOCOMOTIVE**

Burgess-Manning Snubbers installed on this Fairbanks-Morse Diesel-Electric Locomotive.

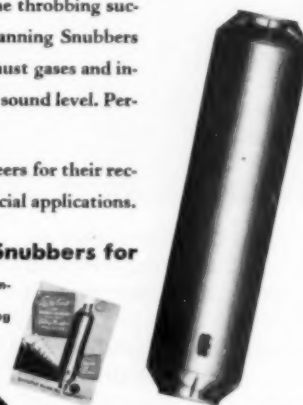
Everywhere in American industry, today, you will find Burgess-Manning Snubbers effectively quieting the pulsating roar from engine exhausts and the throbbing suction of compressor intakes. Burgess-Manning Snubbers are designed to smooth the flow of exhaust gases and intake air. Noise is reduced to the desired sound level. Performance of equipment is improved.

Consult with Burgess-Manning engineers for their recommendations on either standard or special applications.

**Select BURGESS-MANNING Snubbers for**

- Reducing engine intake and exhaust noises • Compressor intake noise • Reducing damaging vibration • Reducing pipe line surging • Reducing steam discharge noise • Vacuum pump discharge noise • Marine, industrial, power plant, chemical, and railroad locomotive applications

**Write for Bulletin** ➔



**BURGESS-MANNING COMPANY**

DALLAS, TEXAS 749-A EAST PARK AVENUE, LIBERTYVILLE, ILLINOIS CHICAGO, ILLINOIS

# "That's What a Man Likes in a Tractor"



## Hard-working International TD-9 scores big in Indiana quarry

The Corydon Stone Company at Lanesville, Indiana, has numerous hurry-up calls for its trouble-shooting TD-9. Dozing crushed stone, pushing chips up on a 40-foot stock pile and cleaning around the crusher are only a few of the tasks it does better and faster.

Operator Steve Bachman says:

"I've operated crawler tractors going on thirty-one years, and I like Internationals better than all the others. The TD-9 really goes to the job in a hurry and gets the job done. That's what a man likes in a tractor!"

Make a date with your local International Industrial Distributor. He'll give you brass-tacks proof of how International power gets out the work. He'll show you fully-equipped repair shops, factory-trained men and full stocks of spare parts. You'll know that his customers are assured of long, profitable service from every piece of equipment he sells.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.



**PILING UP THE CHIPS.** International TD-9 gets all kinds of tidying-up and stock piling jobs done in a hurry, and proves itself a useful quarry hand.



**INTERNATIONAL**

**POWER THAT PAYS**



# THIS IS THE DIESEL

for any job from 32 H.P. up

**M**AYBE this headline surprises you, but it's a fact. General Motors has made it possible to have Diesel power in places where it was never used before—even on jobs requiring as little as 32 horsepower.

The reason is that GM engineers have compressed Diesel power into a smaller, lighter weight engine that provides Diesel economy and Diesel efficiency without sacrificing ruggedness. This sturdy 2-cycle Diesel fits almost anywhere a gasoline engine does—and gets more work done faster, easier and cheaper.

It is simple to operate. It starts quickly. It burns fewer gallons of safer, lower-cost fuel. It takes less time out for servicing. And it costs less to maintain than either gasoline or other Diesel engines.

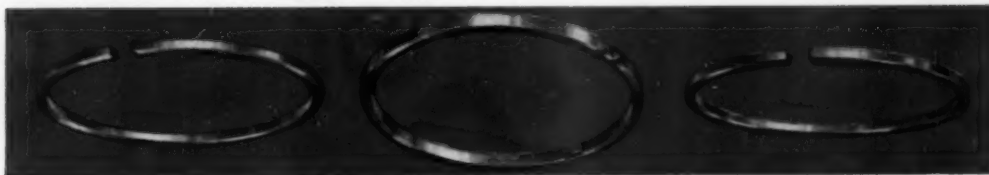
You can have this thrifty, hard-working Diesel in more than 750 different kinds of equipment built by over 150 manufacturers. Write us for the list. And ask your GM Diesel distributor to show you the savings this Diesel can make in your kind of operation.

## DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

*Single Engines...32 to 275 H.P. Multiple Units...Up to 800 H.P.*





#### Koppers K-Spun Rings

Manufactured in diameters up to 12½" by Koppers exclusive centrifugal casting process. 100% stronger, 4 times more resistant to combustion shock than ordinary rings. Will not break in installation or for the life of the engine. For high-speed diesels and other applications where extreme strength is needed.

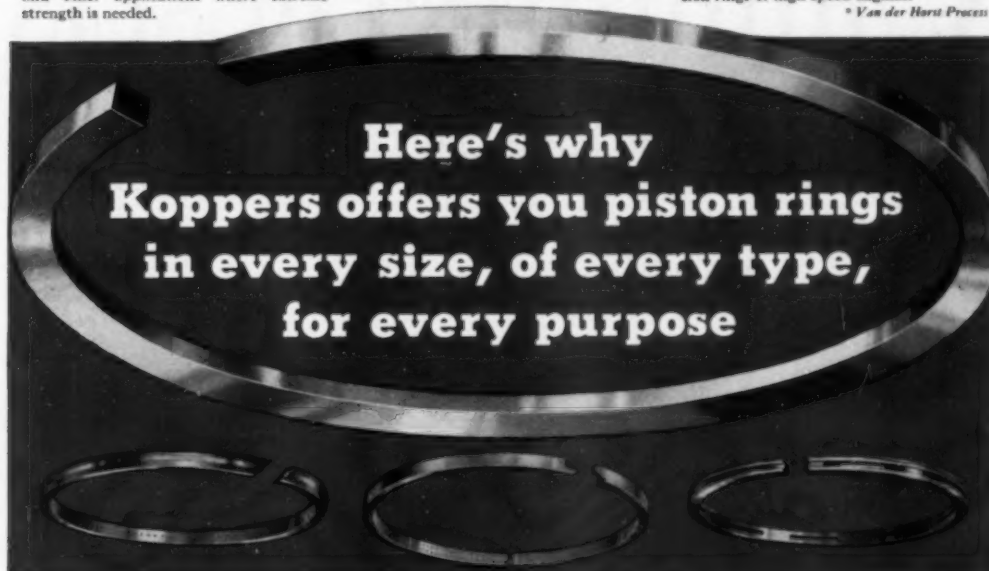
#### Koppers Lug Seal Rings

A specially designed two-piece ring for use on badly out-of-round and tapered cylinders, or on pistons with worn grooves. Maintains compression at a high level, prevents blow-by, provides highly efficient oil control.

#### Koppers Porous Chrome\* Rings

Porous Chrome surface holds and distributes oil during break-in, quickly wears to perfect seating. Combined with K-Spun metal in sizes up to 12½" dia. Last up to 4 times as long as other rings, cut cylinder wear up to 50%. Designed for top compression rings of high-speed engines.

\* Van der Hart Process



#### Koppers Seal Rings

Specially designed ring with a projecting bronze band that causes a burnishing action on cylinder walls. Decreases scuffing and wear on cylinder walls of gas and diesel engines, air and refrigeration compressors and many other applications.

#### Koppers Step-Seal Rings

Designed especially for applications where blow-by is a serious problem. Combines the strength of a single-piece ring with the sealing qualities of a multiple-piece ring. For use on hydraulic presses and diesel and other internal combustion engines.

#### Koppers Oil-Cutter Rings

Exceptional oil control is attained by unique design... 2 bevels for riding over oil on upstroke, 2 scraping edges for taking excess oil from cylinder walls on downstroke, plus a series of wide drainage slots. For use on high-speed, 4-cycle engines.

*These are a few of the hundreds of rings manufactured by Koppers.*

**E**VERY piece of equipment presents a different piston ring problem. Koppers, with its wide variety of rings for every conceivable use, provides the solution to *all* industrial and automotive ring problems.

Our engineers, who work with you in determining the best rings for your applications, have all the facilities of the large, modern Koppers piston ring plant at their disposal... to supply you with the rings that will cut down-time, increase efficiency

and lengthen the life of your equipment.

No matter what kind of equipment you have... railroad, stationary or marine diesels, aircraft or automotive engines, pumps, compressors, steam hammers, hydraulic presses... if it uses piston rings or sealing rings, write, wire or phone us today for experienced help with your piston ring problems. Koppers Company, Inc., Piston Ring Dept., 1583 Hamburg St., Baltimore 3, Maryland.



# KOPPERS

AMERICAN HAMMERED PISTON RINGS

Only KOPPERS can furnish K-Spun or Porous Chrome!

**they're  
custom-built  
to fit the job!**



Work boats, pleasure craft



Drilling rigs, centrifugal pumps, generator sets



Earthmovers, logging yards and loaders



Buses and highway trucks



Off-highway trucks, crawler tractors



Shovels, cranes, industrial locomotives and switchers

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

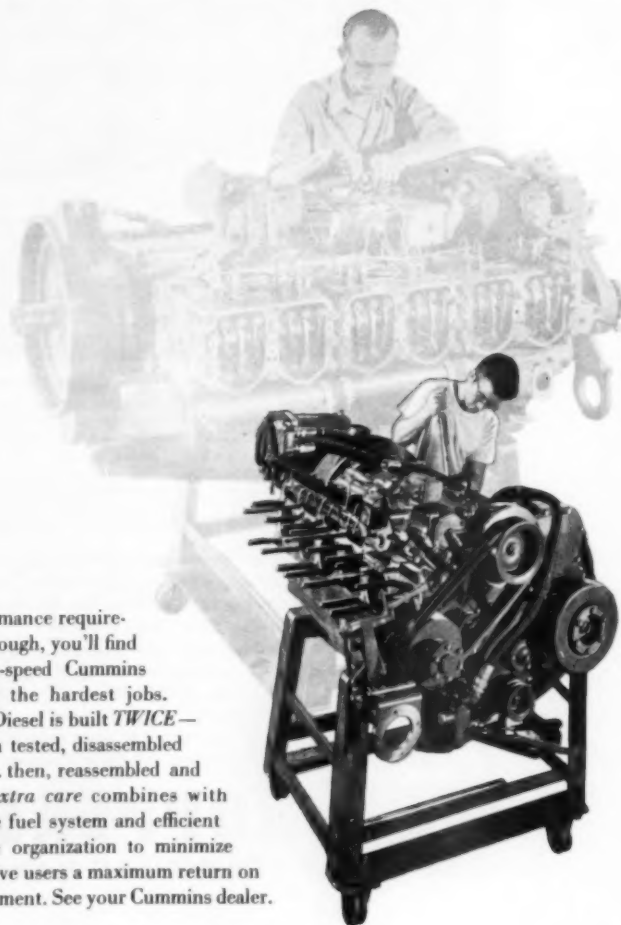
# Cummins® Diesels do so many jobs - so much better

**they're  
BUILT  
NOT  
ONCE  
BUT  
TWICE**



**Diesel power by  
CUMMINS**

Wherever performance requirements are really rough, you'll find lightweight, high-speed Cummins Diesels assigned the hardest jobs. Every Cummins Diesel is built *TWICE* — assembled, run-in tested, disassembled and inspected... then, reassembled and retested. This *extra care* combines with Cummins' unique fuel system and efficient parts and service organization to minimize "down time"... give users a maximum return on their diesel investment. See your Cummins dealer.



**CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA**  
Export: Cummins Diesel Export Corporation • Columbus, Indiana, U. S. A. • Cable: Cumdiex

DIESEL PROGRESS

IN TEN YEARS' OPERATION...

# “Never Shut Down, Never Changed A Cylinder Liner!”

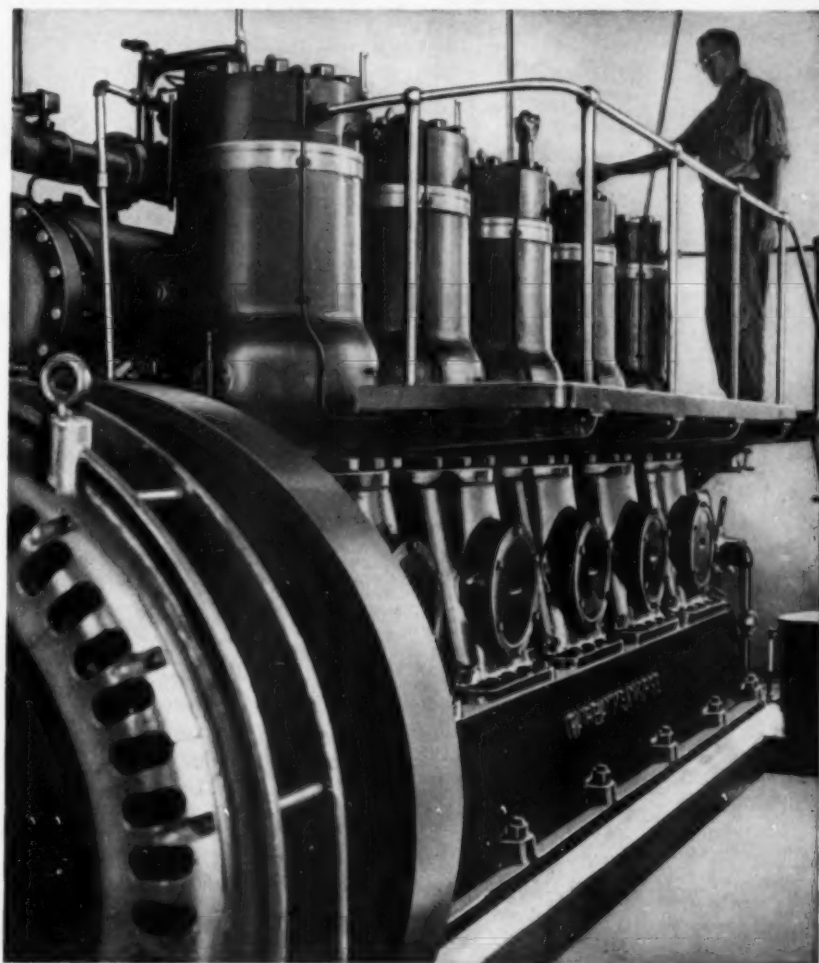
... CITY OF GRESHAM POWER AND LIGHT CO., WIS.

● The City of Gresham Power & Light Company of Gresham, Wis. has two Fairbanks-Morse diesels and two hydro-electric units driven by water power. In the diesels, Mr. M. Fisher, Plant Superintendent, has been using Sinclair Gascon D. One of the engines has used this oil for 10 years.

Mr. Fisher reports that these diesels are running at high efficiency, and hardly ever need attention. He says, “We are getting ideal operation with no appreciable ring wear. We have never had a shutdown due to mechanical failure and have never changed a cylinder liner. I have a lot of confidence in this engine and in Gascon Oil.”

Sinclair Gascon® Oil can save wear, trouble, and retard replacement in your diesels, too, as it has in scores of installations throughout the country. For more details of this fine lubricating oil, phone or write your local Sinclair Representative or write direct to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

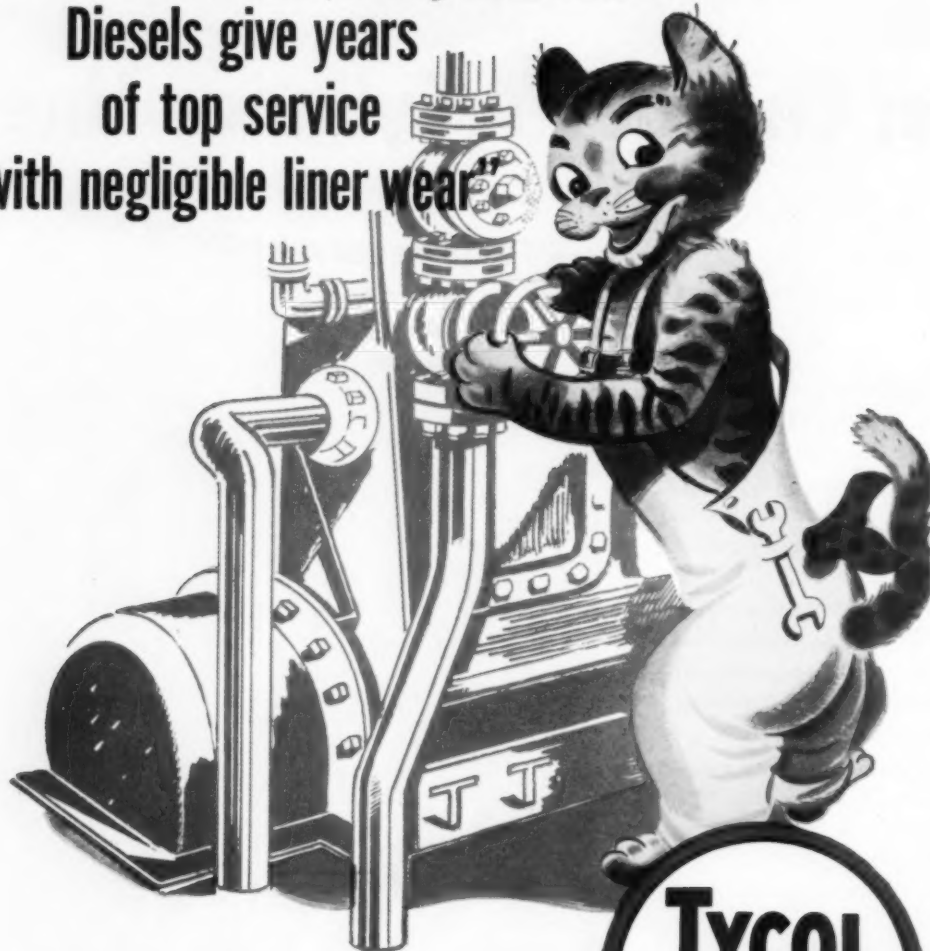
The 5 cyl. Fairbanks-Morse, 375 hp., 300 rpm. diesel of the City of Gresham Power & Light Co. plant. This runs 16 hours a day, needs little attention, thanks to Sinclair Gascon Oil.



## Sinclair Diesel Lubricants

SAVE WEAR AND REPLACEMENT

**"Tycol Adelbus cuts costly overhauls...  
Diesels give years  
of top service  
with negligible liner wear"**



Exactly! Tycol Adelbus Diesel Oils are fortified with selected additives that provide a tough "film of protection," and help to eliminate sludge and varnish. They have excellent detergent-dispersive characteristics and amazing resistance to heat... assure the piston seal that means FULL power and economy... and provide exceptional resistance to oxidation.

Complete information about Tycol Adelbus Diesel Oils is available from your nearest Tide Water Associated office. Call or wire now.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"



Boston • Charlotte, N. C. • Pittsburgh  
Philadelphia • Chicago • Detroit  
Tulsa • Cleveland • San Francisco





# YOUNG

DEPT. 402-C • RACINE, WISCONSIN

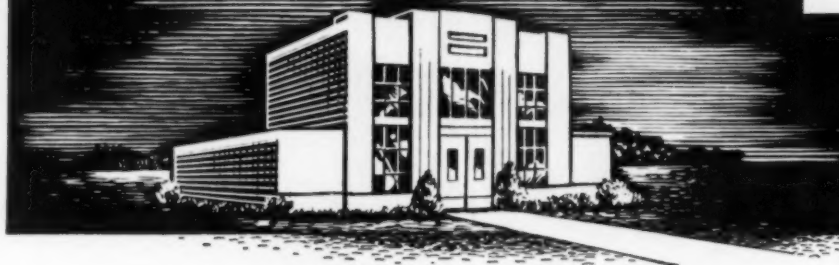
Factories at Racine, Wisconsin and Matoon, Illinois

Heat Transfer Products for Automotive and Industrial Applications

Heating, Cooling, and Air Conditioning Products for Home and Industry.

# Facts

## *ABOUT FAIRBANKS-MORSE DUAL FUEL ENGINES*



- \* Over 160,000 hp. sold — 128 engines.
- \* Savings reported over 50% in fuel cost.
- \* Field conversion parts available for many models.
- \* Basic Fairbanks-Morse design advantages—2 cycle, low rpm, low BMEP, fewer moving parts, proved record of performance.

### *A Sure Way to Get Lower Cost Kw-h!*

Wherever sewage or natural gas is available, diesel plant operators are producing lower cost kw-h by converting to dual fuel—or installing new dual fuel engines. Leading the trend in this relatively new diesel development is Fairbanks-Morse, with field conversion parts for many popular sizes of Fairbanks-Morse

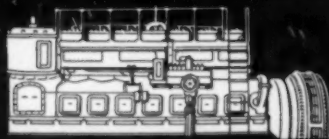
diesels—and with a growing line of factory-built dual fuel engines. If you haven't thought of the savings dual fuel operation can bring to your plant—you should. Write for information, stating size and type of engine in which you are interested. Fairbanks, Morse & Co., Chicago 5, Illinois.



**FAIRBANKS-MORSE,**

*a name worth remembering*

DIESEL AND DUAL FUEL ENGINES •  
ELECTRICAL MACHINERY • PUMPS •  
SCALES • DIESEL LOCOMOTIVES •  
RAIL CARS • MAGNETOS •  
FARM MACHINERY



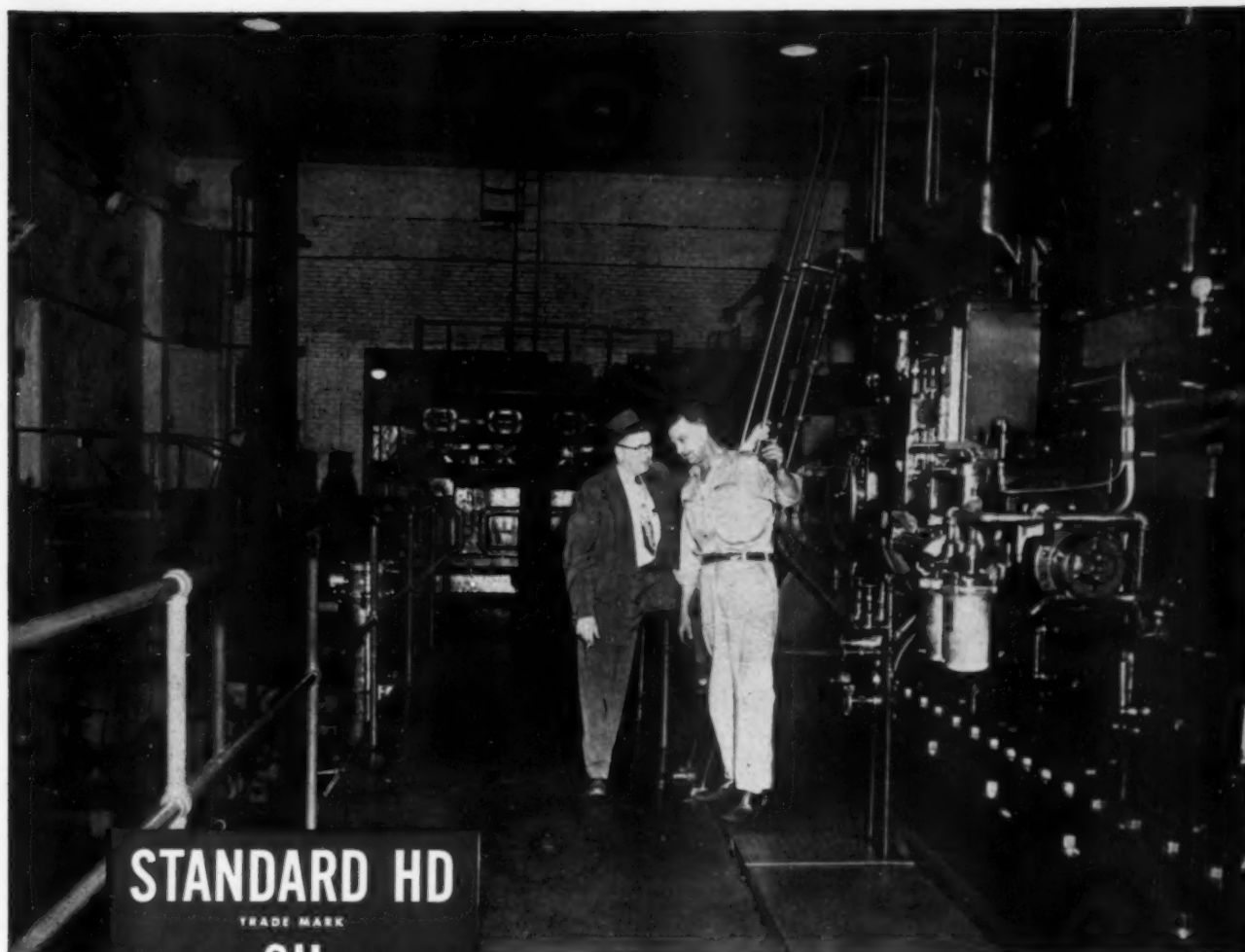
Model 31: Up to 3500 hp.



Model 33: Up to 2000 hp.



Model 38: Up to 2000 hp.  
(Opposed-Piston type)



**STANDARD HD**  
TRADE MARK  
**OIL**

## Solves a diesel maintenance problem

• Excess cylinder and ring wear plus sludge, varnish, and carbon deposits posed a costly maintenance problem for operators of this municipal power station. Overhauls were scheduled every six months. A full set of rings was installed at every overhaul. That was the situation in 1947 when a Standard Oil lubrication specialist recommended changing to STANDARD HD Oil.

The change was made on one of the station's five diesels. These

are the results with STANDARD HD.

Time between overhauls has been doubled, and normally only the two top rings are changed. Cylinder wear has been cut to a minimum, even with the engine operating under heavier loads. The engine has remained clean and there has been no ring sticking. Efficiency has been stepped up from an average of 12.0 KW per gallon of fuel to 12.5 KW per gallon.

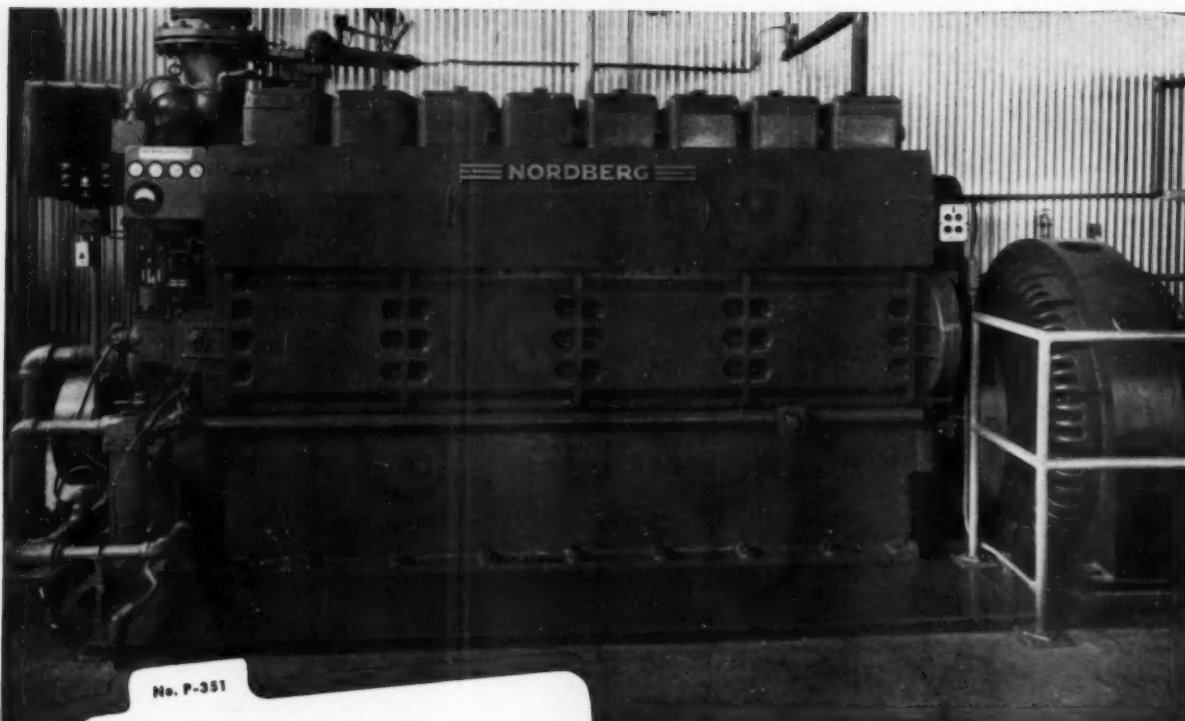
These results, the solution of a costly maintenance problem, have

led to the use of STANDARD HD Oil in the station's four other diesels. Chances are that a Standard Oil lubrication specialist can help you achieve similar results in the operation and maintenance of your own diesel equipment. Put him to work on your problem today. A call to your local Standard Oil Company office is all that's necessary. Or write: Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Ill.

**STANDARD OIL COMPANY**



(Indiana)



No. P-351

**THE CASE OF THE  
STAND-BY DIESEL  
that paid for itself in  
FIVE MINUTES**

**NORDBERG DIESELS FOR EVERY  
POWER REQUIREMENT . . . 10 TO 10,000 H.P.**

For regular or emergency service, you can't beat the advantages of Nordberg Diesels . . . they can be added to the line quickly, and can be held ready for instant service without exorbitant stand-by expense . . . and in the complete line of Nordberg two and four-cycle Diesel engines, including both oil and gas burning types, you will find exactly the right unit to meet your present and future power requirements . . . in sizes up to 10,000 hp.

**THIS 8-cylinder 720 hp Nordberg Supercharged and Intercooled Diesel is connected to a 500 kw AC generator for emergency power needs at the big Owens-Corning Fiberglass plant at Santa Clara, California.**

With the process at this particular plant, an interruption of power for more than 5 minutes' duration could raise havoc with the processing machinery. To guard against any such shutdown caused by a failure of purchased power, the Nordberg Diesel is ready to take over the plant load at once. To make sure full power is instantly available, the engine is constantly maintained at operating temperature. Once each day the engine is started, paralleled with purchased power, and the plant load taken over for a short period . . . assuring its readiness, and familiarizing personnel with rapid operating procedure.

Since this installation was made, eight main power failures have occurred without warning. *In each case, the Nordberg stand-by unit was on the line and supplying emergency power within three minutes.* This service has more than saved the Diesel's original cost.

Here, then, is proved Nordberg Dependability . . . *Ready for instant service!*

**NORDBERG MFG. CO.**  
Milwaukee 7, Wis.

P-351



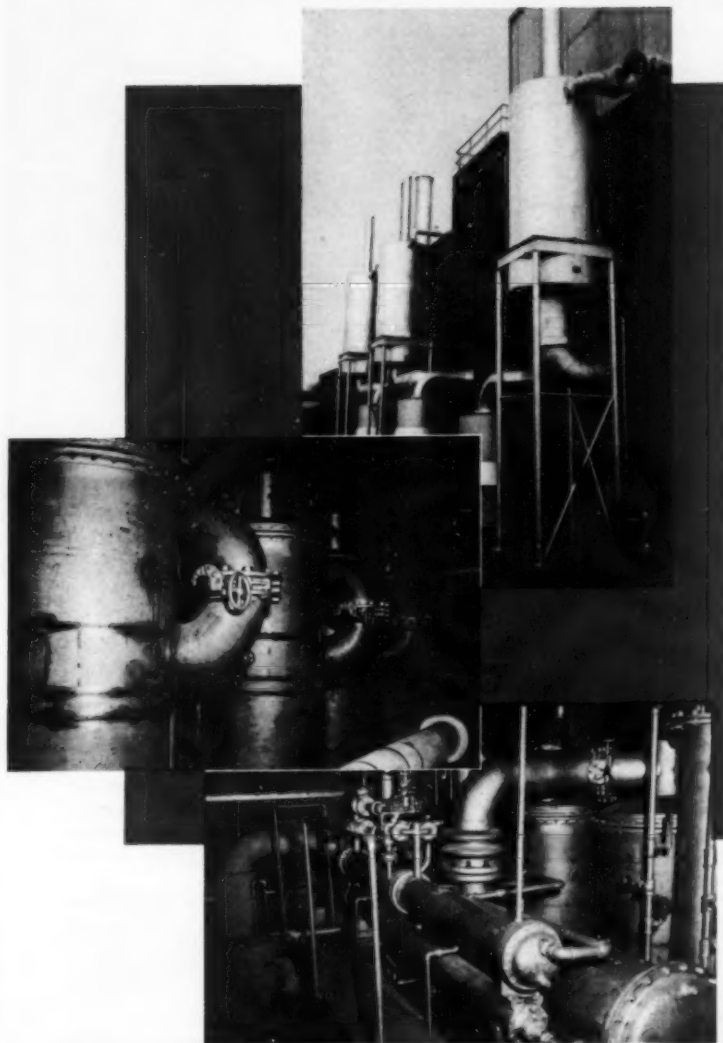
A DIVISION OF NORDBERG

# NORDBERG

## DIESEL ENGINES



# EVERYTHING BUT THE



## WITH MAXIM HEAT RECOVERY SILENCERS AND EVAPORATORS

At Platex Park in Dover, Delaware, the International Latex Corporation is currently using a Maxim installation of real significance.

Basically, the installation in question involves a 1700 h.p., 8 cylinder, turbo charged Cooper-Bessemer Diesel generating set from which exhaust gases are passed through a 16" Maxim Heat Recovery Silencer. Jacket water leaves the engine at 205° and its temperature is further raised in the Heat Recovery Silencer. The water then goes to a flash tank under vacuum where the heat rejected by the engine is dissipated by evaporating cooling.

The steam from the flash tank serves as the motivating heat to two double effect Maxim Evaporator-Distillers, while the cooled water in the flash tank is recirculated through the engine jacket.

By utilizing two sources of engine heat (jacket water and exhaust), the combination of the Maxim Heat Recovery and evaporative cooling features takes advantage of heat that would otherwise be wasted. In such a case fuel savings are often spectacular.

The two double effect Monel and stainless steel Maxim Evaporator-Distillers have the capacity to convert 22,500 gallons per day of raw water to distilled water. If this same amount of water were produced by steam distillation it would require 1000 gallons of 8.3¢ oil per day—or a fuel cost of approximately \$30,000 per year. Purity is another factor. In this case the raw water supply contains 202.4 parts per million (40.0 of this in silicates); the distilled water contains only 1.5 parts per million (0.2 parts per million of this in silicates).

Thus *pure water*, a major industrial problem in many parts of our country, and *fuel saving*, a constant challenge to cost conscious management everywhere, both find an answer in this unique installation.

Consult

# MAXIM

DR.  
SHUSH



### THE MAXIM SILENCER COMPANY

Dept. W.L., 94 Homestead Ave., Hartford 1, Connecticut

Gentlemen: Please send me your bulletin on:

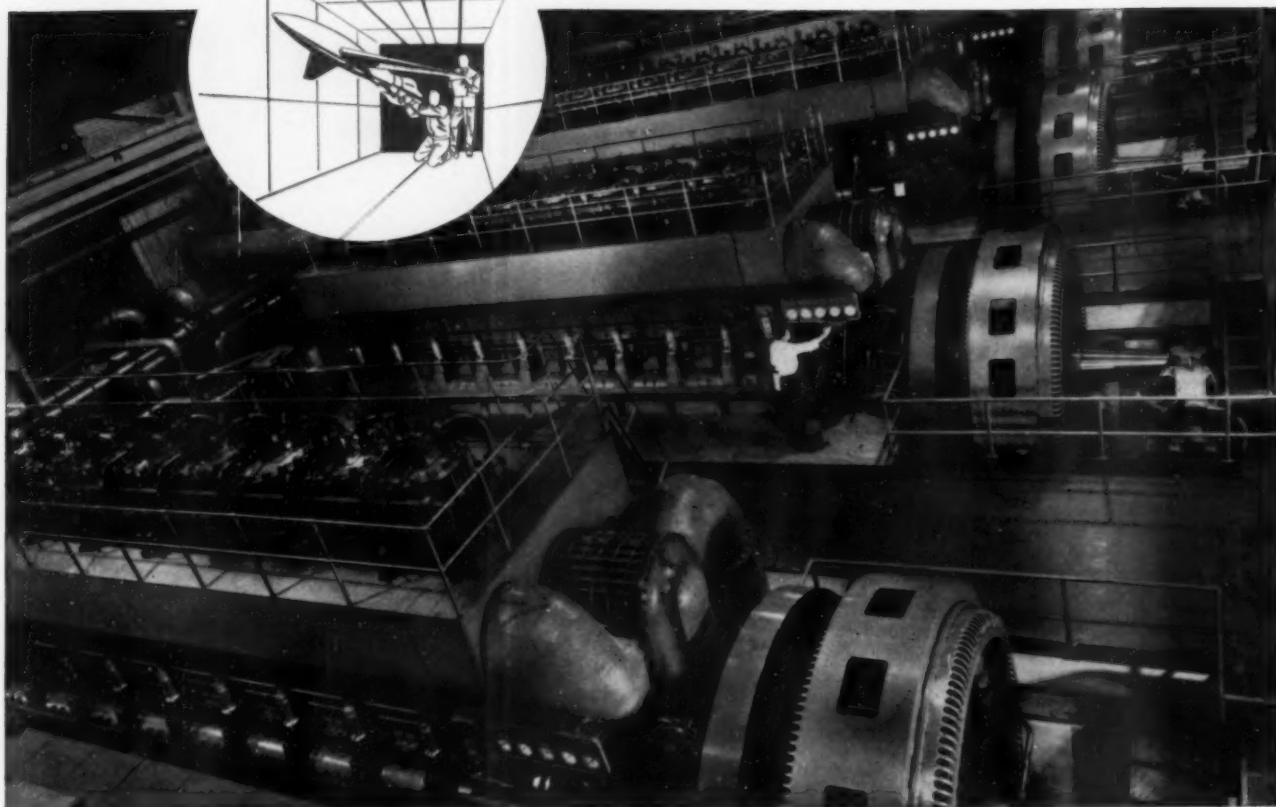
☐ Heat Recovery Silencers ☐ Evaporator-Distillers

Name.....

Company.....

Address.....

At the Langley Aeronautical Laboratory electric power is supplied by these 6,600-volt, 2,500-kw, a-c Westinghouse Generators driven by Nordberg Diesel Engines.



## Electric Power...Made to Order

Many contributions to America's air supremacy have been developed in the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics. Supplementary power at peak loads to operate the large wind tunnels and stand-by power to serve the general research needs is supplied by the engine-generator units shown above.

The specifications for this power plant were wide in scope in 1940—today the specifications for new mammoth wind tunnels are considerably greater. Originally this plant was designed to ease the Laboratory's peak-load demands on the utility system. The engine-generator units had to be capable of starting and picking up large and intermittent loads on little or no notice and be suitable for frequent starting and stopping during any 24-hour period. Also, it was necessary for the plant to carry vital operating loads of the adjacent air base and feed power back into the local public utility system in any emergency.

Westinghouse engineers went to work on the generator problem . . . produced four 6,600-volt, 2,500-kw, a-c generators to handle the job. These Westinghouse Generators have been serving the Langley Aeronautical Laboratory for the past ten years.


Consult your nearby Westinghouse Office for the services of a Power Apparatus Specialist. He will help you select and apply the right generator for your job. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

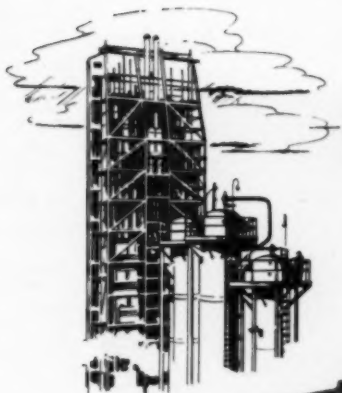
J-10358

YOU CAN BE SURE... IF IT'S

# Westinghouse

AC GENERATORS





# Carefully Refined

**to meet rigid specifications  
of diesel engine manufacturers**

# Ashland

*special*  
**DIESEL**

Our modern refineries, including several catalytic plants, assure you the finest fuels and lubricants.

In every case where engine manufacturers have established specifications, we have equalled or bettered their requirements for that particular grade of fuel. Not only can we meet these requirements, but rigid controls over every refining operation assure that each shipment received adheres to these specifica-

tions. You can depend on Ashland diesel fuels for the same day-in, day-out operating efficiency.

Ashland also offers a complete line of tested lubricants. These include the well-known VALVOLINE and ENARCO brands which many operators of diesel equipment consider the finest in the field.



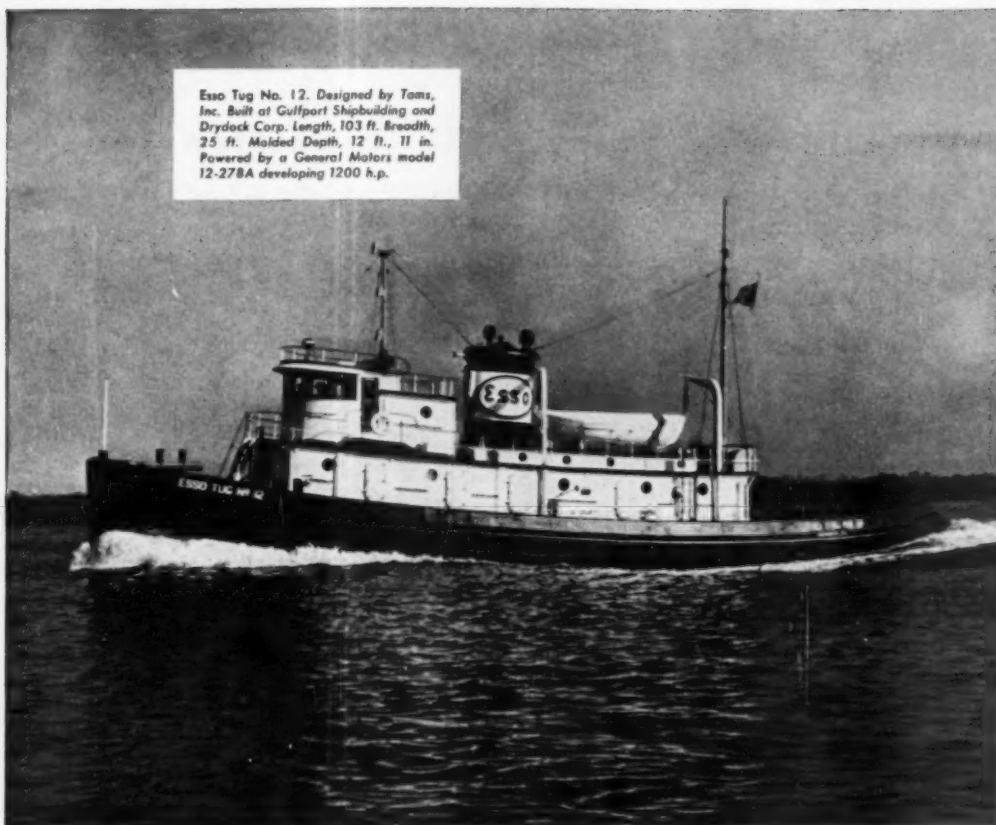
*...complete line of lubricants for diesel equipment*

## ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

SUPPLY TERMINALS: Ashland, Ky. — Buffalo, N. Y. — Canton, O. — Cincinnati, O. — Cleveland, O. — Erie, Pa. — Evansville, Ind. — Findlay, O. — Follansbee, W. Va. — Freedom, Pa. — Kenova, W. Va. — Kobuta, Pa. — Louisville, Ky. — Marietta, O. — Nashville, Tenn. — Niles, O. — Paducah, Ky. — Pittsburgh, Pa. — St. Elmo, Ill. — St. Louis, Mo. — Toledo, O.

Esso Tug No. 12. Designed by Tams, Inc. Built at Gulfport Shipbuilding and Drydock Corp. Length, 103 ft. Breadth, 25 ft. Molded Depth, 12 ft., 11 in. Powered by a General Motors model 12-278A developing 1200 h.p.



Now it's  
**FOUR**  
for Esso

"Esso Tug No. 12" is the fourth General Motors Diesel-Electric powered tug to join the fleet of Esso Standard Oil Company in little more than a year. Wherever towing service requires smooth, dependable, efficient power, GM Diesel-Electric Drive is first choice today.

*No Substitute for Diesel-Electric Drive*

## Cleveland Diesel Engine Division

GENERAL MOTORS • CLEVELAND 11, OHIO



ENGINES FROM 150 TO 2000 H. P.

### SALES AND SERVICE OFFICES

Cambridge, Mass. • Jacksonville, Fla. • Miami, Fla. • Montreal, P. Q. • New Orleans, La. • New York, N. Y. • Norfolk, Va. • Orange, Texas  
San Francisco, Calif. • Seattle, Wash. • St. Louis, Mo. • Tampa, Fla. • Toronto, Ont. • Vancouver, B. C. • Washington, D. C. • Wilmington, Calif.



## The bullet that helps keep engines cool



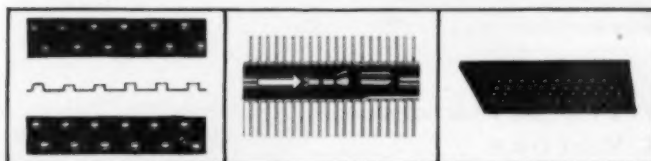
A TRANE Fluid Cooler typical of the hundreds that have been used to cool engine jacket water at the new Point Comfort Works of the Aluminum Company of America at Port La Vaca, Texas.

Secret of the high efficiency of TRANE Fluid Coolers for cooling engine jacket water and lube oil is a bullet. This bullet is shot through tubes in the final step in the creation of the core for the fluid cooler. It expands the tubes into the collars of the fins to form the exclusive TRANE mechanical bond. That bond is as permanent as the metals that form it and as strong as though fin and tube were one. There is no solder or brazing—heat transfer surface is smooth and uninterrupted. Through countless expansions and contractions the same high core efficiency is maintained. Thanks to the bullet and the bond it makes, the TRANE Fluid Cooler operates at high heat transfer efficiency over long periods of service.

The mechanical bond, however, is but one of many features of TRANE Fluid Coolers. Others include construction so rugged that units can be used for stationary or portable installations without additional bracing—mated fans and inlet orifice rings to assure low horsepower consumption—easy accessibility for quick cleaning and maintenance—adjustable pitch fans in larger units so that fan horsepower may be reduced when temperatures are lower.

The TRANE Fluid Cooler is available in 22 standard sizes to cover a wide variety of applications without special construction. They are finished with a weatherproof rubber base paint. A variety of drives can be used.

For more information concerning TRANE Fluid Coolers and the cooling of engine jacket water and lube oil, contact the TRANE sales office nearest you.



**Built-In Precision**—Collars on the fins used in the core of the fluid cooler are belled for accurate spacing and increased heat transfer efficiency.

**Uniform Expansion**—How the bullet expands the copper tube into the collars of the fin to form a perfect and lasting mechanical bond.

**For Greater Strength**—Heavy support plates strengthen and protect the coil—typical of the strength built into TRANE products.

# TRANE

MANUFACTURING ENGINEERS  
OF HEATING, VENTILATING,  
AIR CONDITIONING AND  
HEAT TRANSFER EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WISCONSIN  
Eastern Mfg. Division . . . Scranton, Pennsylvania  
Trane Company of Canada, Ltd. . . . Toronto  
OFFICES IN 80 U. S. AND 14 CANADIAN CITIES

**How many miles do you get  
per gallon?**

**A General Motors Diesel**

**locomotive will haul**

**one ton of freight**

**625 miles**

**from New York to Cleveland**

**on one gallon of fuel oil**

General Motors Diesels now pull more than 33% of all railroad freight, yet they consume one-third less total fuel than oil-burning steam locomotives hauling only 10% of the freight.

**To conserve fuel America needs more Diesels!**

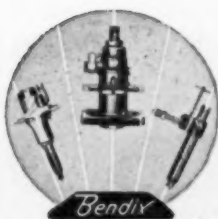


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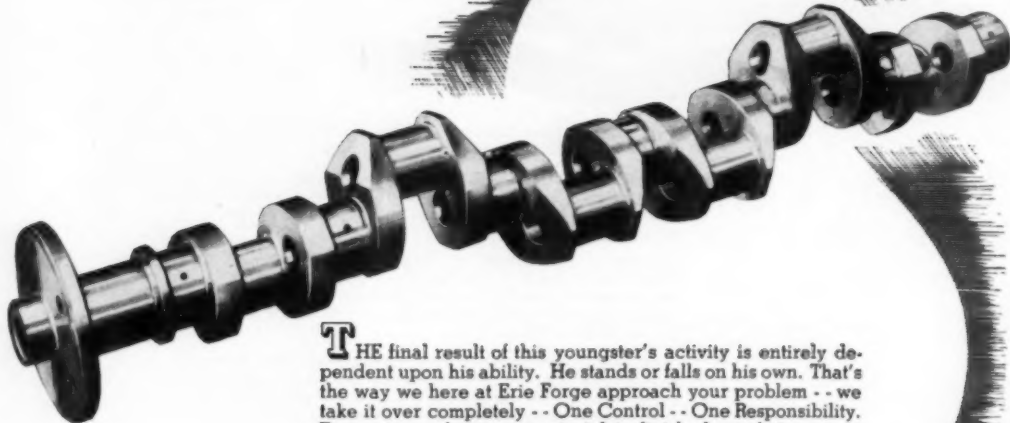
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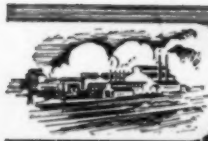
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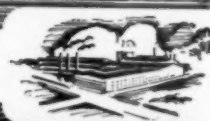


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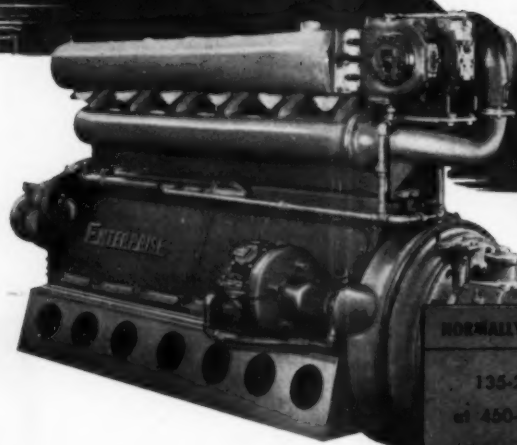
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# FREDONIA, KANSAS

By GEORGE W. OTTO\*

**F**REDONIA, Kansas, has three printing companies that turn out banknotes, bonds and stock certificates, but the town's real moneymaker is a five-engine municipal power plant. For more than a quarter of a century, the plant has shown a profit, turning cheap crude oil into electricity which went to residents and industry at rates well below average. Today, a 1,220 hp. Nordberg Dual-fuel engine is utilizing natural gas fuel in carrying more than 91 per cent of total plant production. The result is a saving of more than \$1,000 a month as compared with the cost of crude oil. Fredonia is a thriving community of 4,000 population in southeastern Kansas. Besides its dominance in the field of banknote printing, the city has considerable industrial activity for its size. There are two alfalfa mills, three grain elevators, a large brick manufacturing plant and two locker plants, bringing the industrial power load to 40 per cent of the

\*Superintendent of Utilities.

total. Favorable rates undoubtedly have encouraged business and promoted the expansion of residential consumption. The home user pays just 5 cents for his first kilowatt-hour and rates scale down to 2 cents. Charges for the big power user start at 3 cents and go down to 1½ cents.

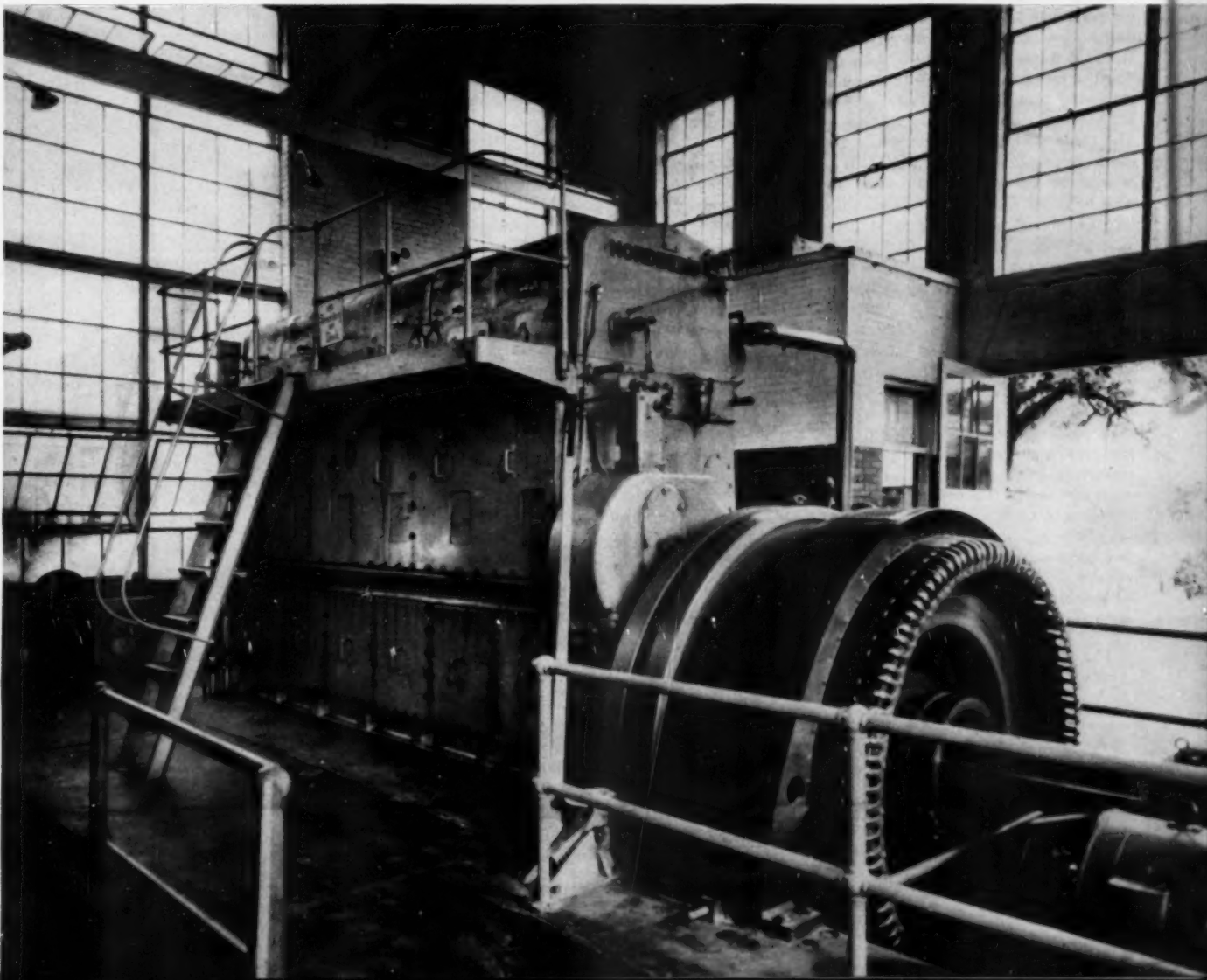
The combination of low rates and consistent profits points to economical power production at the city's plant. Fredonia got its first diesels in 1924, a pair of 300 hp. Worthington air-injection engines. Three years later a 600 hp. Worthington engine of the same type was installed. The next addition came in 1931, when the city purchased an 880 hp., two-cycle, Nordberg air-injection diesel engine. This was the mainstay of the plant for 12 years. Then, in October 1949, the city put into service a six cylinder, 16-inch x 22-inch, four-cycle Nordberg supercharged dualfuel engine rated at 1,220 hp. at 327 rpm.

It was recognized that the new engine, with its diet of natural gas and a small quantity of pilot oil, would be substantially cheaper to run than the oil-burning units and a heavy operating schedule was ordered. In the 12-month period ending October 31, 1950, the first full year of operation, the new engine ran 8,542 hours out of a possible 8,760—actually 97.5 per cent of the time. In that year, the engine generated 4,444,000 kwh. out of a total plant production of 4,878,600 kwh.—91.1 per cent of the total. As of September 21, 1951, the engine has run 15,507 hours with time out for minor adjustments only.

The Nordberg dualfuel unit burned 48,812,000 cu. ft. of gas at a cost of \$10,333.60 and 27,979 gal. of pilot oil costing \$2,448.16. Thus, it took 10.98 cu. ft. of gas and .0063 gal. of oil to produce a kwh. In terms of cost, a kwh took 2.32 mills worth of gas and 0.55 mills worth of oil, a total fuel cost of 2.87

Newest and most powerful engine in the plant is this 1220 hp. Nordberg Dualfuel which was installed late in 1949 and has carried 91 per cent of the load. The governor is a Woodward and the generator an Elliott.

29



# Performance of Nordberg Duafuel Engine

Year	KWH	MCF Gas	Gal. Pilot Oil	Per KWH		Engine Hours	Gal. Lube
				Gas Cu.Ft.	Oil Gal.		
1949							
Nov.....	396,800	3,982	2,421	10.03	.0061	672	150
Dec.....	372,000	4,580	2,455	12.31	.0066	744	168
1950							
Jan.....	353,600	4,452	2,357	12.59	.0066	744	170
Feb.....	301,900	4,084	2,027	13.52	.0067	672	150
Mar.....	274,400	3,750	2,175	13.66	.0079	659	153
Apr.....	313,000	3,940	2,249	12.58	.0071	690	164
May.....	406,300	4,069	1,787	10.01	.0044	744	167
June.....	410,000	3,907	2,277	9.53	.0055	712	157
July.....	401,000	4,011	2,932	10.00	.0073	738	164
Aug.....	432,000	4,063	2,638	9.40	.0061	740	164
Sept.....	392,000	3,900	2,354	9.95	.0060	711	157
Oct.....	391,000	4,074	2,307	10.42	.0059	716	158
TOTAL.....	4,444,000	48,812	27,979	10.98	.0063	8,542	1,922

mills. Currently, the engine is doing an even better job. The first months inevitably are a period of adjustment during which the operators learn to get optimum performance from their new equipment. It is significant that, in the last six months of the year cited, the duafuel engine produced a kilowatt-hour for just 9.87 cu. ft. of gas and .0058 gal. of oil for a total fuel cost of 2.59 mills.

The old air-injection engines burn a crude oil of 24-26 gravity which costs the city 6 cents a gallon. With a production of 11 kwh. per gal. of fuel, the cost per kwh. is 5.45 mills. Comparing this with the duafuel cost for the full year, we get a fuel saving of 2.58 mills per kwh. or \$11,465.52 for the year. Based on the present efficiency of the duafuel unit, the saving amounts to 2.86 mills per kwh. and \$12,709.84 for the same annual production volume. The crude oil takes a little handling before it can be used in the air-injection engines. It is stored in a 75,000 gal. underground concrete tank and must be raised to 130 deg. F. with a gas heater, then put through a centrifuge and delivered to a 1,200 gal. supply tank. Finally, the oil is pumped up to two 400 gal. elevated day tanks in the engine room and flows by gravity through strainers and meters to the four diesels.

Fuel handling for the duafuel engine is virtually automatic. For pilot fuel, the engine uses a 32 gravity diesel oil which is trucked to the plant from a Chanute, Kansas refinery and costs 8.75 cents a gallon. This oil is stored in an 8,000 gal. steel tank, is pumped to two 250 gal. elevated day tanks and flows through strainer and meter by gravity to the engine. The natural gas, which has a heating value of 1050 btu. per cu. ft., comes to the plant at 20 lb. and is metered at that pressure. It then is reduced to 13 lb. and fed to the engine through an admission valve held open by pilot oil pressure. Thus, if pilot oil fails, the engine instantly switches over to full diesel operation.

The engine has run satisfactorily with as little as five per cent pilot oil, however, a greater safety margin is preferred to insure ignition, and the unit runs normally with pilot oil supplying seven per cent of the heat energy. Although a detergent oil is used to lubricate the new engine, a Fuller's earth filter is used for purification. It is felt that this type of filter does the best job and that enough fresh detergent oil is supplied to the cylinders by the cylinder lubricators to provide the benefits of the

additive oil. Lubricating oil is drawn from the bottom of the crankcase by a motor-driven pump, put through the purifier, and returned to the crankcase. If necessary, oil can be drained from the engine and put through a batch purifier which removes water dilution as well as the solid impurities. In practice, the gas unit runs clean and has presented no lubrication problems. At this writing, pistons have not been pulled, but crank and main bearings have been inspected and found clean and in perfect condition. In the continuous purifier, it has been necessary to change filtration elements only every three months, which represent more than 2,000 hours of engine operation.

In the year cited, the duafuel engine used 1,922 gal. of lubricating oil for an average of 5,442 hph. per gal. Actually the performance was considerably better. The gallonage recorded is the quantity fed through the cylinder lubricators which is greater than actual consumption. Approximately one-third of the oil has to be drained off from the crankcase supply. Allowing for this reclamation, the engine is running better than 6,000 hph. per gal. of lubricating oil consumed.

The new engine was tied into the plant cooling water system which employs motor-driven centrifugal pumps and a spray pond. Though the system is open, treated city water is used for makeup and there has been no trouble with scaling. In the Nordberg duafuel engine, lubricating oil is used to cool the pistons and in turn is circulated through an oil cooler. There are alarms on pressure and temperature of lube and jacket water. Air for the duafuel unit comes through an oil-bath filter to the exhaust-driven turbocharger which supplies the cylinders with fresh air under pressure. The exhaust gases, after leaving the turbo-charger, vent through a vertical silencer.

The plant is well staffed with four operators, a chief operator and two oilers, all under the supervision of the superintendent of utilities. Matters of policy are determined in consultation with Mayor D. A. N. Chase and Commissioners G. A. Baker and A. A. Anderson. Fredonia believes in sound operation, both mechanically and financially. In spite of regular contributions to other city departments, the plant has been able to accumulate suffi-

The Nordberg Duafuel engine is served by an Air-Maze oil-bath air filter and a Maxim exhaust silencer.

DIESEL PROGRESS



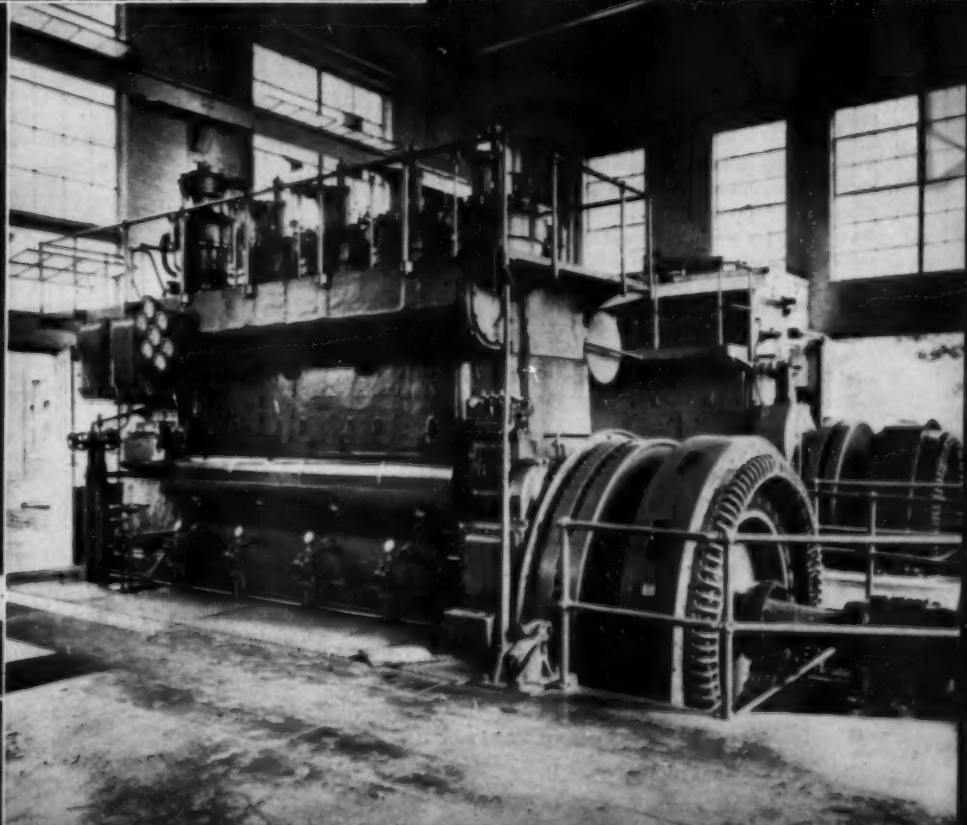
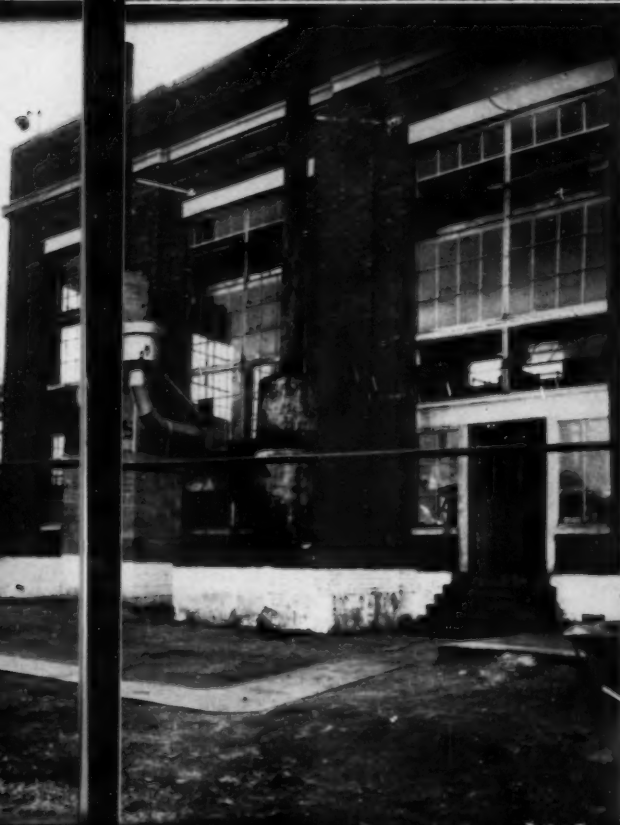


cient reserves so that it could pay cash for its 1,220 hp. engine and still retain \$30,000 in the sinking fund. All this, of course, was achieved with the oil-burning engines. Today, with the load rising steadily and the dualfuel unit handling the bulk of production, the city is assured of even greater profits in the years ahead.

#### List of Equipment

Engine—One six cylinder, four-cycle 1220 hp. 16 x 22 in. supercharged Dualfuel engine operating at 327 rpm. Nordberg Mfg. Co.  
 Generator—The Elliott Co.  
 Turbocharger—Elliott Buchi.  
 Pilot Fuel—32 gravity. MFA Refinery.  
 Fuel Meter—Xacto.  
 Gas—Union Gas Co.  
 Gas Regulator—Emco.  
 Gas Safety Valve—Fulton Siphon.  
 Governor—Woodward Governor Co.  
 Fuel Filter—W. W. Nugent & Co., Inc.  
 Cylinder Lubricators—Manzel Inc.  
 Lubricating Oil—DTE 3D, Socony Vacuum Oil Co.  
 Lube Oil Filter—Honan-Crane Corp.  
 Lube Oil Cooler—Ross Heater & Mfg. Co., Inc.  
 Lube Purifier—Youngtown-Miller Co., Inc.  
 Jacket Water Pumps—Aurora Pump Co.  
 Air Filters—Air-Maze Corp.  
 Silencers—Maxim Silencer Co.  
 Compressor—Curtis.  
 Switchboard—General Electric Co.  
 Pyrometer—Alnor, Illinois Testing Lab.  
 Gauges—Lonergan.

Nordberg engines have been the mainstay of the Fredonia plant since 1931 when the 880 hp. air-injection diesel at left was installed. The 1220 hp. Dualfuel unit in the background took over the bulk of the load in October, 1949.



# TUNA CLIPPER "AGGRESSOR"

By JAMES JOSEPH

**W**ORDS for many people have many meanings. Take the word "rotation." For State-side-looking Korean GI's, "rotation" is a joyous word. It means reprieve. But for Capt. "Barney" Maughan, skipper of the dieselized tuna clipper *Aggressor*, and for a lot of his fellow fishermen, "rotation" means inactivity, and more time in port than a tuna clipper skipper and his \$500,000 worth of ship can afford. "Rotation" is the word you hear echoing along the docksides of San Diego, Calif. where many of the 218 boat tuna fleet—some \$16,000,000 in clippers—are tied up. Their inactivity is purely economic. Since 1948, when the Japanese tuna fleet climbed back to prewar strength, importation of Japanese-caught tuna has put a flying wedge into the American market. Last year Japanese tuna importations took 30% of the American market. Some more came from Chile, but the Japanese product took the lion's share. Tuna shipped by fast refrigerated ships to American canneries is being processed under American labels and the powerful diesel tuna fleet lies at dockside in San Diego. That's where that word "rotation" comes in. It's a new word for tuna men, and it means that the clippers rotate their trips to the tuna schools. Only a few are allowed at sea at a time. "Rotation" means that all boats get a crack at dwindling tuna markets. And it also means a new low for tuna boat construction. The effects of this enforced inactivity has dealt a telling blow to the once prosperous tuna industry—California's fourth ranking industry.

As Frank M. Perry, past president (1951) of the Tuna Boat Association told DIESEL PROGRESS, "Any man who'd lay a keel down today should have his head examined. There hasn't been a new contract for tuna clipper building for over a year now and I can't see that there will be as long as importations glut the market." And Perry said emphatically, "you can quote me on that!"

The pinch affects every supplier of the tuna fleet, diesel engine makers, and their suppliers. Ships that aren't built don't need diesel engines, so fewer and fewer new clippers will be sliding down the ways, for only those boats actually contracted before the pinch are being completed. As one clipper owner-manager said, "Why we built this new ship I don't know, and now that we've got it, I don't know what we'll do with it." Thousands of tuna men and their families are wondering the same thing.

For powerful clippers like the *Aggressor* the future seems dark. The *Aggressor* was launched Dec. 15, 1951 and is now on her maiden voyage. All clippers are allowed to take a maiden voyage, a first chance to recover a portion of their tremendous cost. But after that?—nobody knows.

The *Aggressor* has an overall length of 125 ft. 6 inches; a molded beam of 28 ft. 6 inches and is powered by an 800 hp. DMG 39 Enterprise diesel engine, eight cylinder, supercharged 12 inches x

15 inches 400 rpm. Electricity to power the *Aggressor's* many pumps and motors is supplied by three auxiliary diesel engines driving d.c. 110 volt generators. There are two GMC 610 diesel engines driving directly coupled 125 kw. G.E. d.c. generators. A GMC 671 diesel drives a 60 kw. G.E. d.c. generator.

Owner-manager of the \$355,000 medium-large *Aggressor* is Joe Rogers who also manages the *Mary Jo*, *Sun Traveler*, and the *Valiant*. The *Aggressor* was built by San Diego's Martinolich Shipbuilding Co. The *Aggressor* has a tuna capacity of 275 tons and is refrigerated by 3, 6 inch x 6 inch Worthington ammonia compressors. The clipper has a total fuel capacity of 45,000 gallons; a cruising range of approximately 15,000 miles; lubricating oil capacity of 1500 gallons, and fresh water storage (water maker) for over 3000 gallons.

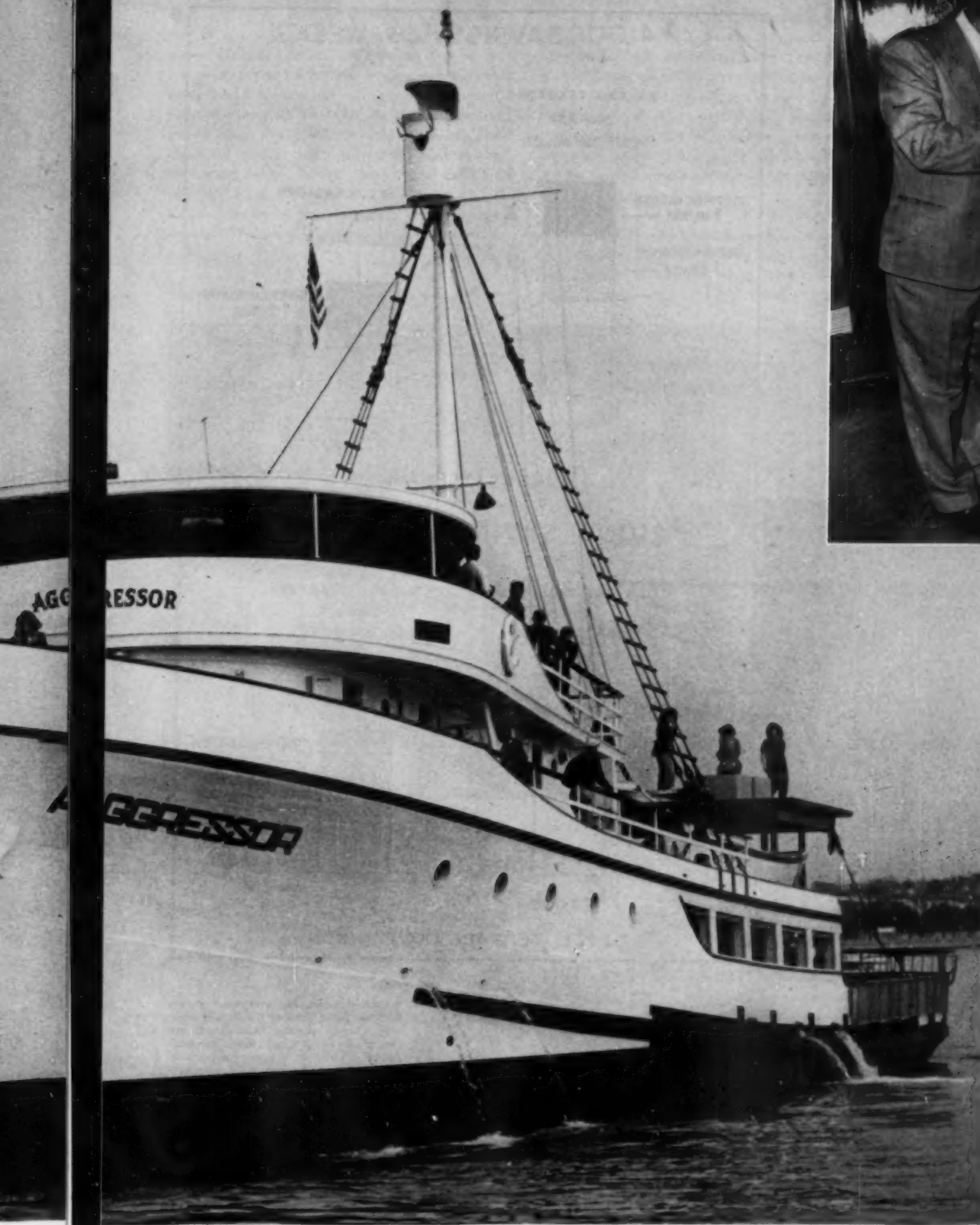
Three Martinolich-built bait pumps, 8-inch, 10-inch and 12-inch are installed. Another of the clipper's features is a monel metal main drive tailshaft. Installed is a Harrison jacket cooling system; switchboard instruments by Martinolich; fuel and lube oil filters by Winslow; and a Fairbanks-Morse fuel oil transfer pump. The *Aggressor* has a complete system of lube oil pressure and temperature alarms, and is equipped with a tuna-school finding radar. Automatic Sperry steering, including remote control unit, is another feature. The lube oil cooler is by Harrison, and the heat exchangers are by Ross. The *Aggressor* is equipped with an Alnor exhaust pyrometer. Lube oil being used is General Petroleum OX5. The clipper has 9 bait compartments.

The *Aggressor's* keel was laid shortly after the Korean war, but shortages of certain parts held up



Captain Barney Maughan. He sails the *Aggressor* when the market for tuna permits.





Anthony Martinolich, President, Martinolich Shipbuilding Co. of San Diego, at wheel of his latest masterpiece, the *Aggressor*.

◀ Tuna Clipper *Aggressor* powered with an eight cylinder, supercharged 600 hp. Enterprise diesel.

launching until December, last year. Meantime, the tuna picture has changed, almost completely. There are a dozen or so other clippers currently underway or near completion, and all of these, like the rest of the San Diego fleet, are taking to uncertain seas. "Rotation" continues as the most important, and forlorn, word in the tuna men's vocabulary. For it is a fleet rule that no ship sails to

the tuna schools unless it first has a prearranged market. With slow market brought on by the importation of tuna, the boats are leaving in rotation. Some boats arrived last year only to find that they had to await unloading. As weeks dragged by the total net profit from the catch decreased. It costs about \$1000 a week for a tuna clipper to lay by the docks, keeping 24-hour watch, keeping up re-

frigeration and insurance, awaiting its turn to unload. It is into troubled waters such as these that the San Diego tuna fleet, one of the greatest in the world, sails. And the picture isn't much brighter for the *Aggressor* and her crew of 14. The fish are out there. There are 218 clippers, dieselized and ready, to get them, but the market, as a tuna man complained, "just isn't there."

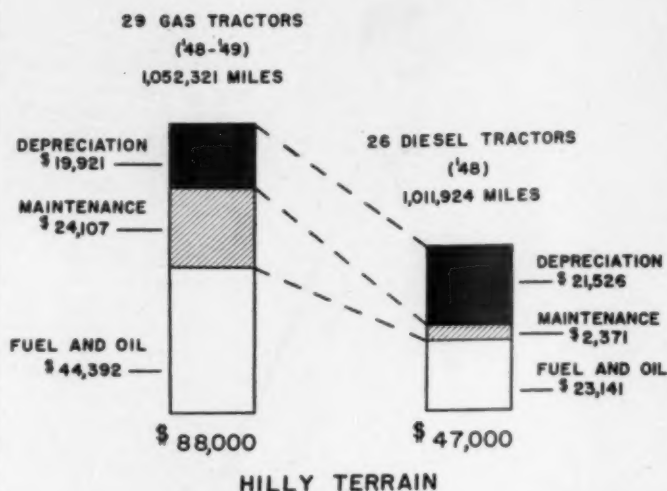
# DIESELIZING THE TRUCKING INDUSTRY

By RAYMOND SCHUESSLER

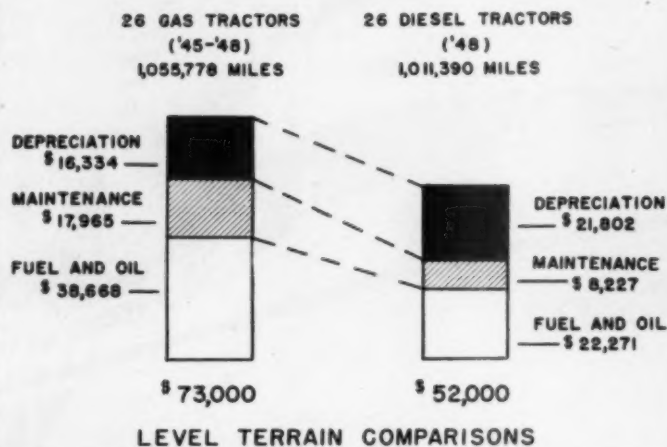
As diesels increase their efficiency while growing smaller and more mobile, they broaden the opportunity in practically every business. Take for instance the trucking industry. The increasing mobility and efficiency with decreasing cost of operation is making possible a decentralization of industry, and at the same time gives the manufacturer access to a greater range of markets. As has been demonstrated in World War II and in the present crisis, rapid, economical truck transportation makes possible the utilization of thousands of sub-contractors, in both military and civilian production.

Businessmen whose main interest is in something other than truck transportation have recently realized that truck deliveries play a vital part in their net profits. A survey made for the wholesale

## \$ 41,000 SAVINGS- 36 WEEKS

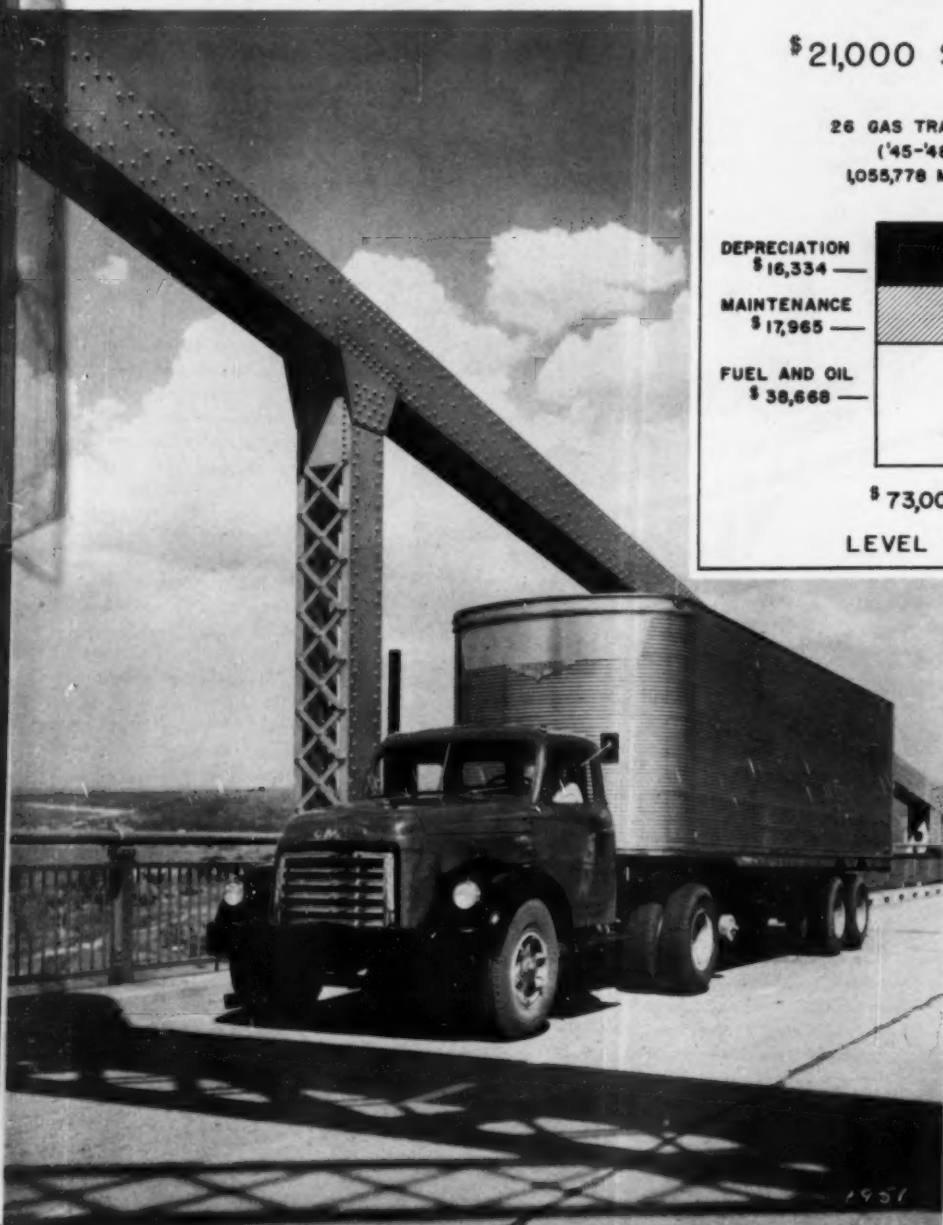


## \$ 21,000 SAVINGS 36 WEEKS



A survey made for wholesale grocers who use large fleets of trucks and highway tractors showed that diesels are far more economical than gasoline-powered units in over-the-road operations, especially over hilly terrain.

The "Million-miler" diesel engine in this highway tractor crossing the international "Blue Water" bridge between Port Huron, Mich., and Sarnia, Ontario, was designed to haul loads for a million miles and more, a life span giving truckers amazing economy.



grocery industry pointed out to wholesalers their cost of raw material, labor, and most other expenses were fixed beyond their control. One of the few places where the grocers, or any other business using trucks, might shave expenses is distribution. Here, the survey pointed out, the proper selection of truck size and power for the job to be done could cut expense while increasing efficiency. In one example cited, where diesel trucks could be used instead of a conventional gas line model, it meant a saving of \$50,000 a year, a tremendous amount even for a multi-million-dollar wholesale grocer.

Today we have diesel truck engines designed to

run a million miles, which spreads the somewhat higher initial cost of a truck over a much longer life-span, while its maintenance and operation cost is immediately less. With fuel that costs an average of one-third less than gasoline and gives far better mileage per gallon, it's easy to see how a hosiery manufacturer can locate his factory in the hills of Tennessee, where power is relatively cheaper, and get his product to New York or Eau Claire at a competitive price.

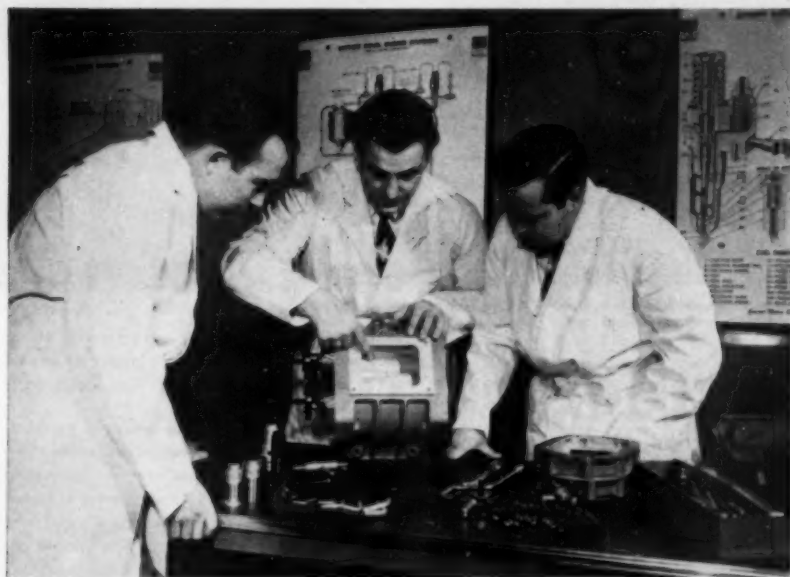
A few years ago diesel trucks were a factor only for people engaged in hauling huge loads over long distances because the engines were so big they could be only used in the heaviest trucks. Almost

year by year the size and weight of diesel engines has been reduced until now it is possible to take advantage of their economy in as little as a two and one-half ton truck.

Less than 10 years ago diesels were used in only 2% of the annual truck production in the 19,500 lb. and up weight classification. In 1951 over 20% of the trucks in that weight range had diesel engines of either the two or four-cycle design. Today there is a definite trend toward the dieselization of almost all of the long haul trucking industry. Smaller diesels now on the drawing boards are likely to push the current boom in diesels beyond even the wildest dreams of Dr. Rudolph Diesel.

Special mobile training schools for mechanics have taken the mystery away from the diesel engine, which at one time was regarded as a complex mechanism rather than the simple economical unit that it really is.

One of the 287 new diesels to which the entire fleet of the McLean Trucking Co. has been converted is the subject of discussion here between Malcolm F. McLean (second from left) company president, and a group of his drivers at Winston-Salem, N.C. McLean switched from 200 hp. to 133 hp. in order to achieve lower operating and maintenance costs while getting 15 per cent more payload per unit through the decrease in vehicle weight. McLean Trucking is one of the largest companies operating through the East.



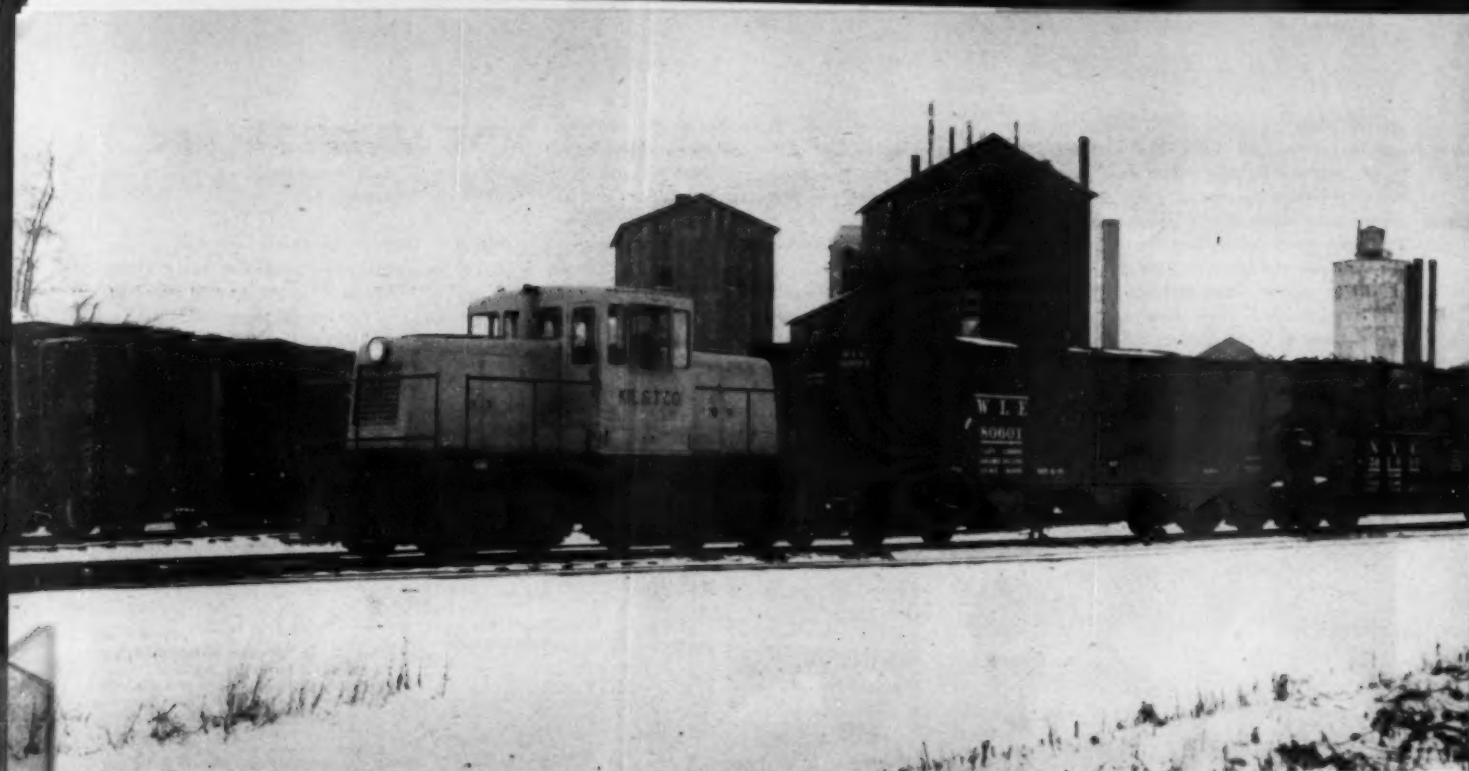


Fig. 1. Cold weather presents no obstacle to the operation of diesel-electric switchers, nor does it decrease their efficiency as it would that of a steam locomotive.

## COLD WEATHER OPERATION OF DIESEL-ELECTRIC SWITCHERS

**Adequate Preparation Helps Maintain Winter Performance at a High Degree of Availability**

By K. O. ANDERSON\*

**D**IESEL-ELECTRIC industrial switching locomotives can be operated successfully in winter weather, even when the mercury falls below zero. The performance of hundreds of such locomotives in many localities is proving this. By anticipating cold weather conditions and preparing adequately, the operator can expect to keep his locomotive running in winter with the same degree of reliability he enjoys during the summer. A figure of 95 percent availability is not uncommon.

Starting the diesel engine is likely to offer more difficulty than any other item during cold weather. This type of engine inherently demands a high cylinder temperature, caused by rapid air compression, to ignite the fuel. Various tests have shown that the cranking time is decreased by increasing the cranking speed. It is also decreased by an increase in ambient temperature and a decrease in altitude. A minimum cranking speed of about one-tenth the running speed appears to be necessary. Cold weather causes difficulty in starting for three main reasons: 1. It makes the engine lubricating oil more viscous, thus increasing the

cranking torque required. 2. It reduces the cranking battery capacity. 3. It cools the cylinder walls so much that the heat of compression may be absorbed before the firing temperature is reached.

There is a temptation to use excessively light lubricating oil or to add kerosene or fuel oil to the crankcase to make the engine easier to crank in cold weather. This should not be done, as the lube oil will then be too light for good lubrication when the engine reaches operating temperature, which is the same the year round. Another good rule to lengthen engine life is, do not apply load until the engine has reached approximately normal operating temperature.

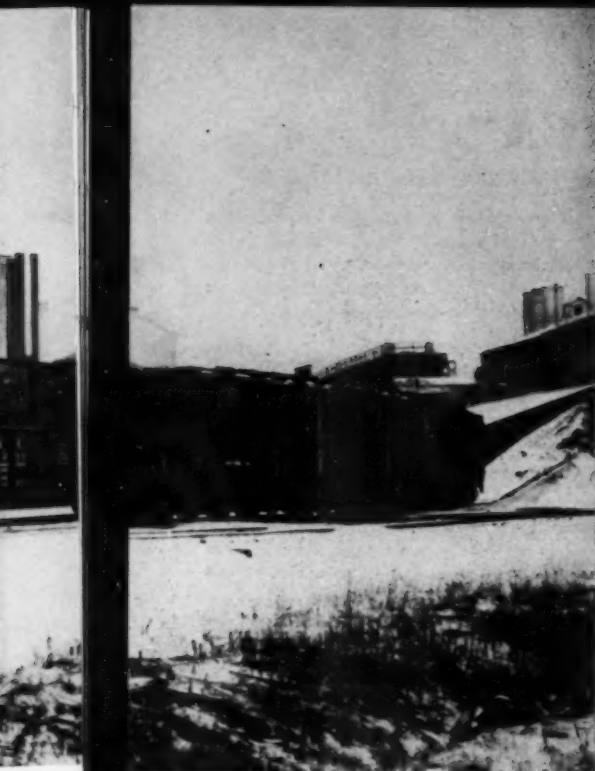
Battery capacity will decrease on the order of 0.65 percent per degree F. of temperature fall. For instance, the capacity of a given battery will be reduced 50 percent when its temperature goes down from 80 to 0 F. Some diesel engine users keep an auxiliary battery on hand, and maintain it at operating temperature, to use as a booster in starting the engine. However, this practice is not common with locomotive operators, because of the large size of battery required. Special batteries of other than the lead-acid type, while they perform better

at low temperatures, cost several times as much as the former, and take up more space.

The best single method to insure easy starting in the winter is to store the locomotive in a warm place. A warehouse or shop where the temperature does not fall below freezing would be generally acceptable. Some locomotive owners have built insulated storage sheds which have no heat source other than the heat remaining in the locomotive at the end of a duty cycle. The temperature required for easy starting will vary with the individual engine. Experience has shown that the unsupercharged automotive type diesel engine used in industrial switchers will ordinarily start satisfactorily if the temperature is not far below freezing. Supercharged engines require a temperature of about 40°F., because they have a lower compression ratio and more valve overlap.

Temporarily releasing compression will not necessarily help the engine to start by allowing a higher cranking speed to be reached. When the engine is cranked under compression, most of the air compressed in each cylinder on the upstroke returns energy to the system on the downstroke. If the compression is relieved, none of the energy is re-

\*Loco. & Car Equipment Dept., General Electric Co., Erie, Pa.



turned to the system. Depending upon its particular characteristics, an engine may crank faster with compression held than with it released.

If heated storage is not available, starting can be made easier by the use of some type of auxiliary or standby heater to keep the engine jacket water warm while the locomotive is not in service. Such heaters are mounted inside the engine cab of the locomotive, and are available in both kerosene and diesel fuel burning types, as well as in electric models. While the diesel fuel burning heater has the advantage of not needing a separate fuel supply, it does require an electrically-driven blower and ignition and, perhaps, a pump. These can produce an excessive drain on the locomotive battery over a period of time. Kerosene heaters, widely used on locomotives, require no battery power but do need a special fuel tank. Electric heaters, also widely used on locomotives, require the least attention of any type. They are available in both 110 and 220-volt models, and need only be plugged into wayside auxiliary power to operate. Still another aid to cold-weather starting is the engine intake-manifold air heater. A manually-operated priming pump sprays a small amount of fuel into the manifold, where a spark plug ignites it. The air warmed in the manifold helps to heat the cylinder walls and aids fuel atomization.

Any of this equipment can be installed on an existing locomotive by the owner. In the case of a new locomotive, it is desirable, from the standpoint of both cost and performance, to install the equipment during construction. Moreover, technical knowledge, trained workmen, and shop facilities are more readily available at the factory.

Quality of the fuel to be used during cold-weather operation should be carefully checked. General rules call for a minimum of wax and moisture content, with an adequately low pour and cloud point.

Even though a fuel may be relatively moisture-free when received, it can accumulate much water during storage or in the locomotive tank. A good rule is to keep the locomotive tank as full as possible at all times—just as you do with your automobile in cold weather.

The electric system of a diesel-electric switching locomotive needs no special attention because of cold weather. Although the lowered resistance of motors may demand slightly more engine horsepower, at the same time the engine can develop more horsepower because of the greater density of the cold intake air. The net result is about a standoff.

The traction motor gear lubricant should be changed in cold weather to a lighter grade, according to manufacturer's instructions. Condensed moisture may cause trouble in the air brake system by freezing in cold weather. Distributing and application valves have numerous small ports that may freeze, and check valves may do the same. Daily blowdown of the main reservoirs will practically eliminate this source of trouble. Wet sand will freeze in the sanding system during cold weather. Take care to have the sand thoroughly dry before putting it into the sand boxes. Be sure the sand-box covers are always in place, to keep out rain and snow.

According to ICC requirements, the operator's cab of a locomotive should be kept at 50°F. or warmer during normal winter weather. The cooling system of a locomotive will normally have sufficient capacity to heat the cab. If one heater in the cab does not have sufficient capacity a second can be installed. However, if the locomotive is out of operation or allowed to idle for long periods of time, sufficient heat may not be rejected into the cooling system to keep the cab warm. The use of standby engine-water heaters will help in this situation.

Considerable difference exists between the application of diesel-electric locomotives on the railroads and in industrial plants. Railroads operate on a 24-hour, 7-day a week basis, using their locomotives as much of this time as possible. Industrial plants often operate for 8 or 16 hours, 5-days a week. As a result, different facilities are required by each operator. The railroads may be able to get along without storage by allowing the engines to idle while not in use. This would hardly be practical during a 60-hour weekend at an industrial plant. Even overnight idling would be impractical, for the fuel injectors would be almost sure to foul excessively. Railroad locomotives have cooling systems with capacities of as much as 400 gal. per engine, making the cost of antifreeze practically prohibitive. Industrial locomotives, having a capacity of 16 gal. or less per engine, can use either permanent or alcohol type antifreezes, as long as the manufacturer's instructions are observed.

Each winter sees the satisfactory operation of increasing numbers of industrial diesel-electric switching locomotives. By making adequate preparation, following established recommendations, and using good quality fuel and supplies, any owner can insure successful cold-weather operation of his locomotive.



Fig. 2. Radiator capacity of a diesel-electric switcher averages only about 16 gallons, so the cost of antifreeze for cold weather operation is not prohibitive. Filling is most conveniently done with a hose.



Fig. 3. Fuel tanks should be filled daily during cold weather in order to diminish condensation of moisture in the fuel.



Fig. 4. Clean, dry sand is a "must" for winter operation. Wet sand is apt to freeze in the sand boxes or traps.

# DIESEL TUG "W. S. RHEA"

**C**ONTINUING a postwar fleet modernization and expansion program which has steadily increased the tonnage it has transported on the inland waterways, the Mississippi Valley Barge Line Co., St. Louis, has just placed in service another powerful new towboat. Built by Dravo Corporation, the 176-foot vessel incorporates in her design many features for efficient inland waterways river navigation.

She was christened the *W. S. Rhea*, in honor of the barge line's chief inspector and oldest employee in point of service. On August 14, Mr. Rhea's wife broke the traditional bottle of champagne on the bow of the new vessel as it slid down the launching ways into the Ohio River at the Dravo shipyard, Pittsburgh. The towboat is virtually a duplicate of the *L. Wade Childress* which Dravo launched for MVBL in 1948. It is the seventh vessel Dravo has built for MVBL. The *Rhea* will operate mainly on the lower Mississippi River. With a fuel oil capacity of 89,000 gallons, she is capable of making non-stop trips of up to 3000 miles. This contrasts with riverboats of early years which had to stop frequently to take on fuel for their boilers and often carried one or more bargeloads of coal in their regular tows to feed the boilers. General dimensions of the *W. S. Rhea*—length overall 176 feet; beam molded 40 feet; depth at side molded to main deck 11 feet. The hull and superstructure of the new towboat are of welded steel construction throughout. The main deck house encloses the machinery space, galley and mess room, crew lounge and four crew staterooms. The upper deck house contains quarters for the officers. On top of this is the Texas house with staterooms for the captain, chief engineer, pilot and owners. The pilot house is above and forward of the Texas house and its floor is approximately 29 feet over the load water line.

The *Rhea's* hull is subdivided by seven main transverse watertight, oil-tight bulkheads which extend to the main deck. One longitudinal bulkhead is built on the center line the full length of the boat. Transverse framing is on 24-inch centers, except for a distance of 22 feet aft of the bow where 20-inch spacing is used for more rigid reinforcing. In general, the side and bilge plating is formed of 17.5 pound steel. The bottom plating is a minimum of 15-pound steel. Forward, the hull is of molded form with four towing knees fitted into and forming part of the bow. The hull aft is formed in specially designed tunnels into which are integrated the two Kort nozzles that encircle the propellers for increased pushpower and better maneuverability.

The *Rhea* packs 3200 hp. in her two 16-cylinder General Motors (Cleveland) diesel engines. Each engine is equipped with a General Motors-Falk Airflex conversion kit for air-operated reversing gears and clutches which eliminate the necessity of stopping the engines to reverse. With these gears, the engines remain running in one direction while the propellers are reversed. Westinghouse Air Brake pneumatic controls on the boat give the

pilot fingertip operation of the main engines, a feature that has proved time-saving in maneuvering the vessel. Similar controls also are located in the engine room.

Electrical power for the towboat is provided by two diesel driven (Cleveland GM) generator sets each rated at 100 kw. ac. Along with each three-phase, 440-volt ac. generator is a 20 kw., 120 volt, dc. generator driven on the same shaft. The towboat's steam heating system consists of an oil-fired automatic boiler supplying radiators. Three automatic, electric water heaters are installed. One 30-gallon unit each supplies hot water for the dishwashing machine and the galley sink, respectively, and one 125-gallon unit furnishes hot water for the washroom. The vessel also is equipped with an oil-fired Paracoil distilling plant with a minimum capacity of 240 gallons of water daily. A 450 gph. Wesco turbine-type pump driven by a 1 hp. motor is used for the wash water system and a similar size pump is used for the potable water system. Self-cleaning stone filters with a capacity of 350 gph. each, are provided for clarification of raw water. They are Lynn Filters manufactured by the Hygeia Filter Co., Detroit.

The fresh water storage tanks, in the forward hold have a total capacity of some 2100 gallons. They are constructed of steel, coated inside with Amercoat. The two four-bladed propellers of the *Rhea* are fabricated of high tensile manganese bronze. Each has a diameter of 8 feet, 9 inches. Goodrich Cutless rubber bearings are fitted in the strut and stern tubes which are lubricated by two motor-driven Burkes circulating water pumps.

Dravo steering gear of the double-acting ram type are operated by oil pressure. There are two steering and four backing rudders on the boat. Each gear is capable of moving its rudder system from hard-over to hard-over in 13 seconds or less. Westinghouse Air Brake controls operate the system between the pilot house levers and the floating levers which are used in connection with this follow-up type gear. A 200-gallon sump tank is provided for the steering gear oil pumps which are positive displacement DeLaval's with steel rotors and Tobin bronze liners. They can deliver a maximum of 128 gpm. at 1750 rpm. against a maximum discharge pressure of 300 psi. Motors for the pumps are 25 hp.

Although the *Rhea* is designed and equipped for rugged, general river service, every effort has been made to provide comfortable accommodations for the crew. All areas exposed to the weather in the living quarters are insulated. Windows have aluminum sash and are fitted with venetian blinds. The galley is equipped with two 3-foot Hotpoint electric ranges, a coffee maker and other food preparation appliances including an electric deep fat fryer. Food service is counter style at an attractive Formica-topped serpentine-shaped counter 27 feet long. Instead of the usual stools, there are 10 comfortable leather upholstered arm chairs at the counter. At the forward end of the main deck

house, near the crew's lounge, there is a small snack bar with refrigerator, sink and coffee maker. The officer's lounge is on the upper deck and measures 10 feet wide by 22 feet long. Both lounges are fitted with comfortable chairs and tables.

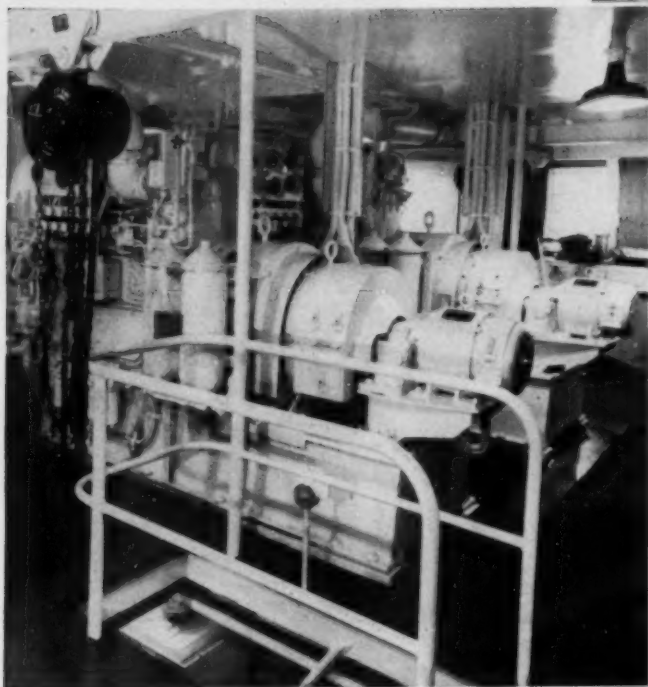
The sink in the galley is a 102-inch stainless steel unit with a Hobart automatic dishwasher. Automatic appliances also are featured in the laundry where there are a 24-inch by 36-inch American Laundry Co. automatic washer and a 20-inch clothes dryer. The 50-inch ironer for the laundry was supplied by the Chicago Dryer Co. Bulk food storage facilities consist of a Tyler 75-cubic foot reach-in box for fruits and vegetables; another of the same size for meats, and a dairy box. Primary and standby Frigidaire condensers with 2 hp. motors are provided for the refrigerators. In addition to refrigerators, the boat has a deep-freezer.

Two 10 hp. single barrel Dravo capstans are installed midship and one 15 hp. double barrel Dravo capstan is installed on the bow. Drive for the capstans is through DeLaval vertical worm gear reducers having a reduction ratio of 35 to 1. Port and starboard winches are installed on the bow and a small hand capstan is provided on the stern. Rope is stored on two horizontal reels built into a recess in the forward end of the main deck house. The pilot house is a model of efficiency. Three front windows are sloped inboard on a 20° angle to reduce glare. Steering levers and other unpainted metal fixtures of the control console are all chrome plated. Among the modern equipment in the pilot house are a Raytheon radar set, ship-to-shore telephone, engine room telephone, teletalk set for two-way conversation between the pilot house and barges, a turn angle indicator, a Sperry gyro-compass, electric controls for the searchlight, foot pedals for the air horn and an experimental automatic steering unit that will hold the vessel on a set course.

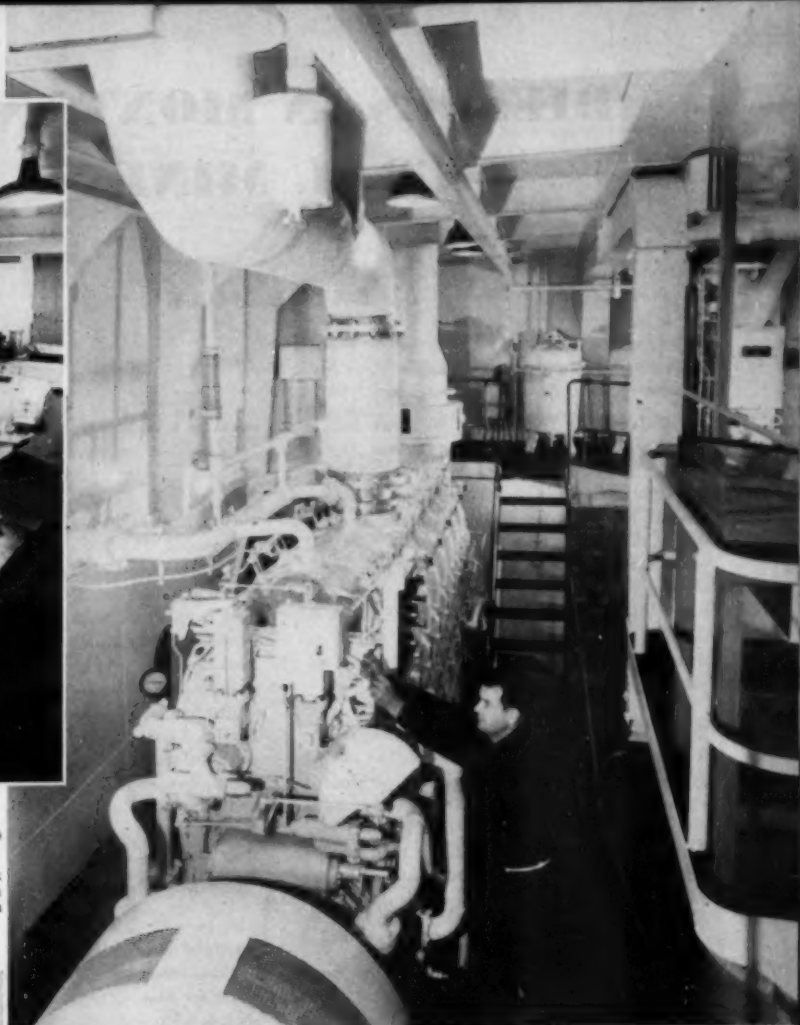
Lighting on the towboat consists of two 19-inch electrically controlled Carlisle and Finch carbon arc searchlights on the forward end and one 3000-watt manually-operated Crouse-Hinds incandescent searchlight on the pilothouse roof. Two 1000-watt Benjamin floodlights are mounted on the aft end of the forward end. An 18-foot river yawl is stowed in chocks on the aft end of the towboat and a crane is provided to handle it.

## List of Equipment

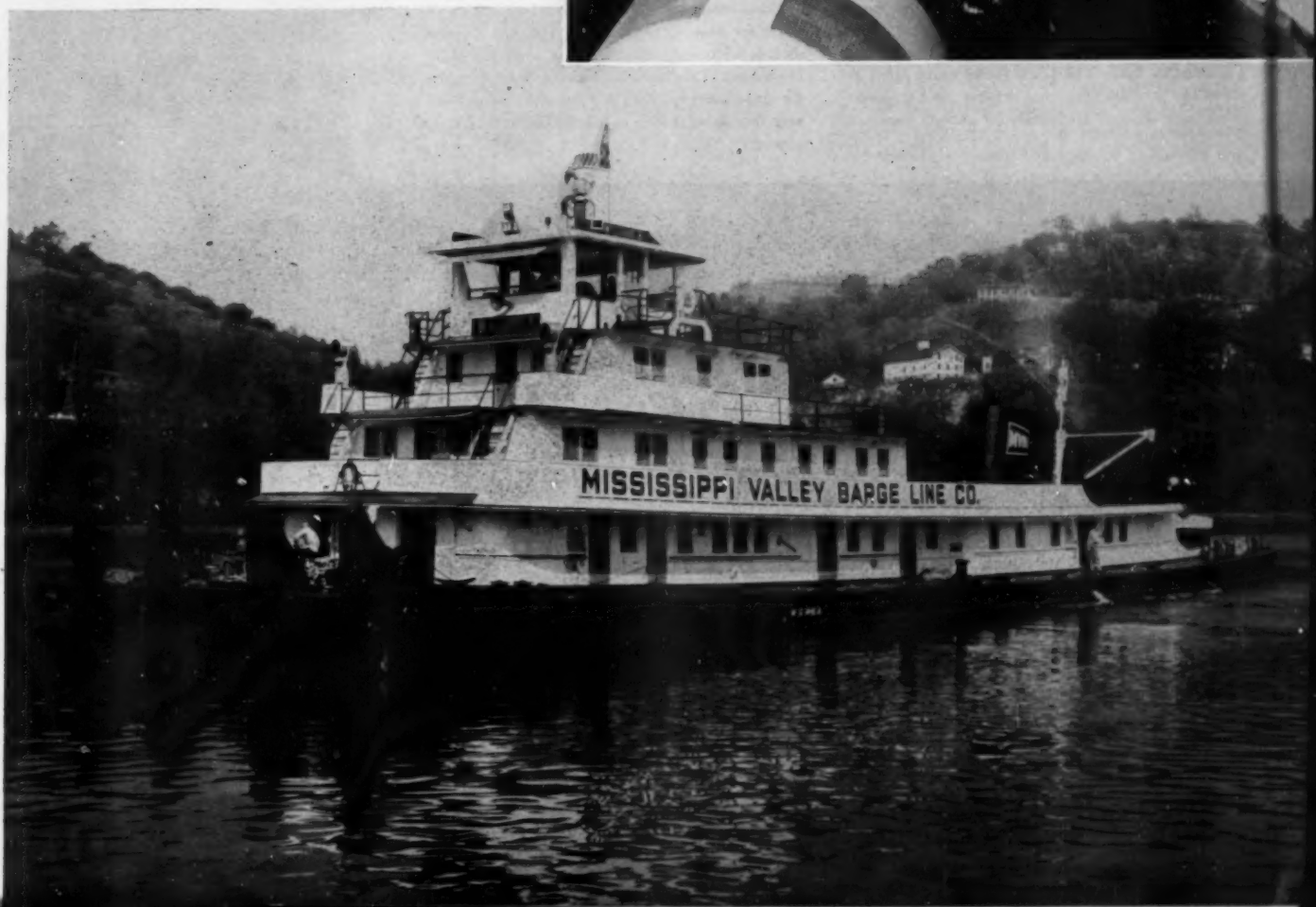
Main Engines—General Motors Cleveland Model 16-278A.  
Generator Units—General Motors 3-268A engines.  
Generators—100 kw. ac. and 20 kw. dc.  
Reverse Gear—Falk Airflex.  
Lube Oil Filters—Briggs.  
Jacket Water Coolers—Ross.  
Intake Air Silencers—Farr Company.  
Lube Oil Centrifuges—DeLaval.  
Fuel Oil Centrifuges—DeLaval.  
Main Engine Controls—Westinghouse Air Brake.  
Fuel Oil Transfer Pump—Roper.



Two G.M. diesel-driven generator sets provide electrical power for the *Rhea*. Each set consists of a 100 kw-ac generator and a 20 kw-dc generator, both driven on the same shaft.



Port engine, looking forward. Fawick air-operated reversing gears and clutch in foreground. Marquette governors on all four engines.



# DIESELS IN MONTANA COAL MINE

By DAYLE MOLEN

**M**IDWAY in 1950 Surmi Coal Mines, Inc., of Montana purchased two General Motors model 3-268A diesel generating units. Within a few months after installation in August, 1950, the increase in production had paid for the original cost of the diesels. Today, with average daily coal production per worker about six tons in the U. S., seven miners are taking out between 140 and 160 tons a day from the Surmi mine on Hound creek in north central Montana. The reason: a complete diesel electrified operation which enables the company to produce more coal with less men.

Before 1944 when Surmi first began mechanization, it took 28 men to mine the same amount of coal as seven men are producing now. First modern equipment used boosted production for seven miners to between 50 and 60 tons a day. Power was provided by a 65 hp. diesel International Pd-40, and a 65 hp. International gasoline engine. Still, lack of sufficient power frequently slowed production.

Purchase and installation of the new and more powerful diesel equipment has solved that problem. The two International units are retained on a stand-by basis. The GMC diesel units, rated at 150 hp. at 1,200 rpm., and driving 100 kw. generator sets, are used alternately for periods from two

weeks to a month. Operations, on an eight-hour basis most of the year, jump to 16 hours during fall and winter. The diesels haven't failed yet.

Diesels brought higher production, have proven inexpensive. Monthly oil bill runs between \$200 and \$225. George Hornick, mine manager, estimates it would cost \$500 monthly to buy power from a utility. Hornick figures the diesels will be providing power for Surmi Mines quite a few years from now. The engines themselves have an interesting history. Constructed in 1943, they were installed in an LST as auxiliary power plants. Shortly after the naval vessel was launched, it was captured by the Japanese. Instructions on operating the equipment are written in Japanese language and still visible on the generator faces. Recaptured by the Americans, the engines eventually found their way into a war surplus lot after the war. Hornick found them there and bought them.


The two-cycle diesels now provide power for a variety of mine machinery. A 35 hp. Jeffrey cutting machine uses power from the diesel to ready coal seams for blasting. A chain of steel bits chews a six-foot wide and eight-foot deep undercut along the bottom of the shaft for an even break-off when the dynamite explodes. A 3 hp. drill bores holes near the top of the seams for dynamite sticks. Coal



Surmi Mine's outside equipment with coal-rich Montana hill in background. Diesel plant is housed in building at right.




Shuttlecar takes on load of coal at Surmi's Hound Creek Mine.



Twin GMC diesel generator units, rated at 150 hp., at 1200 rpm., which provide power for Surmi Mine equipment. Diesels, bought at a Seattle war surplus sale, paid for themselves in two months by increasing coal production.

is loaded by a 7BU Joyloader equipped with a 25 hp. electric engine. A revolving circular apron digs into the loose coal, and two heavy steel arms pull the coal from the apron onto a conveyor belt. The Joyloader can handle  $4\frac{1}{2}$  tons a minute. The Joyloader conveyor belt carries coal to a home-made, mobile shuttlecar of eight tons capacity. The shuttlecar, powered by a 40 hp. GE motor, is equipped with large truck tires, including dual rear ones, to give it effective traction on the shaft floor. It transports the coal to the tippie where one 25 hp. and four 5 hp. motors run conveyor belts carrying the fuel to the truck loading chute. The shuttlecar dumps with its gondola-type bottom.

The Surmi mine is one of the few in Montana using a shuttlecar instead of mining cars and track. A two-wire, 250 volt trolley line has been installed for the shuttlecar. Use of the shuttlecar for seam-to-tippie transportation has been made feasible by the easy accessibility of the shaft, now about 1,800 feet back into the hill. It may not always be the most economical process, Hornick feels. When it becomes practicable, he plans to install a big conveyor belt from the tippie to a point about midway in the shaft. The shuttlecar then will carry only from the seam to the conveyor belt, which will transport the fuel to the tippie. Diesels will be called upon again to power the conveyor belt.



Coal produced is a bituminous grade and most of it goes to the Great Falls air force base. All current production finds its market in a nearby area. Fifteen men are employed by the mine. Hornick owns a majority interest in the corporation. Frank Jurasek, who runs the cutting machine, also owns an interest. Mack Hamilton, Great Falls public accountant, owns the remaining stock. There's no immediate prospect of Surmi Mines running out of coal. The company owns 520 acres and has 640 acres leased. Seams in the coal-rich hill run far back, and Hornick estimates the company has an untouched reserve of at least a million tons. That's enough to keep Surmi in business for quite a few years. The mine has been producing coal for about 60 years, but during the greater part of that time, the market was confined to farms in the Hound creek area and output was small. It took a silent partner—diesel—to provide the impetus when this Montana industry came into its own.

A 35 hp. Jeffrey cutting machine uses diesel power to prepare seams for blasting. Chain of steel bits undercuts eight feet into the vein and six feet

REUTERS.



# INDIANA PUBLIC UTILITY LAYS BIG GAS LINE, PLANS "BIGGEST INCH"

By W. L. BODE

**"MOVING** up in class" is the phrase horse handicappers would apply to present and planned pipelaying activities of the Public Service Company of Northern Indiana. Up until June of this year the Hammond, Ind., public utility company had never lowered anything larger than 12-inch gas mains into a trench. Currently, however, the company's own 150-man spread is finishing a 51-mile stretch of 22-inch natural gas pipeline. And this same crew will tackle a 15-mile length of 36-inch pipe—the "Biggest Inch"—before the first snow flies this year. While actual work on the 22-inch pipeline extending from Gary to South Bend, did not start until June 1, 1951, company officials had decided to go ahead with this job last year.

As you might well imagine, assembling a pipelaying crew of 150 specialists for this job in a limited time took a bit of doing. The company did have one big advantage, however, since it has conducted training courses for welders for the past

eight years. Graduates from these courses helped fill out the crew that O. E. Ruzek, spread superintendent, had ready to go to work when June 1 rolled around.

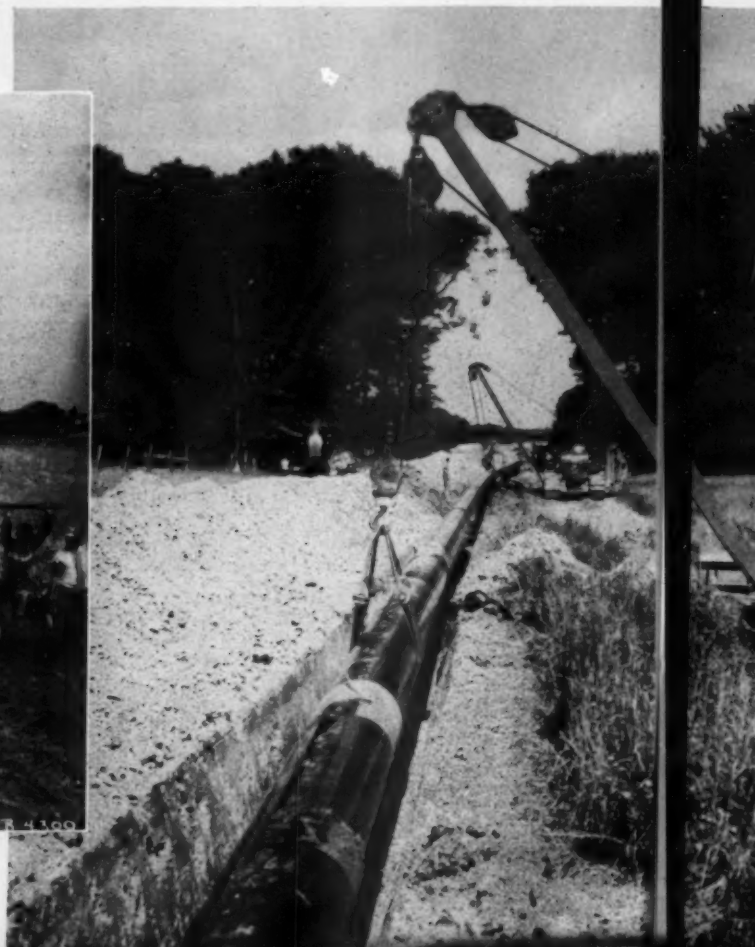
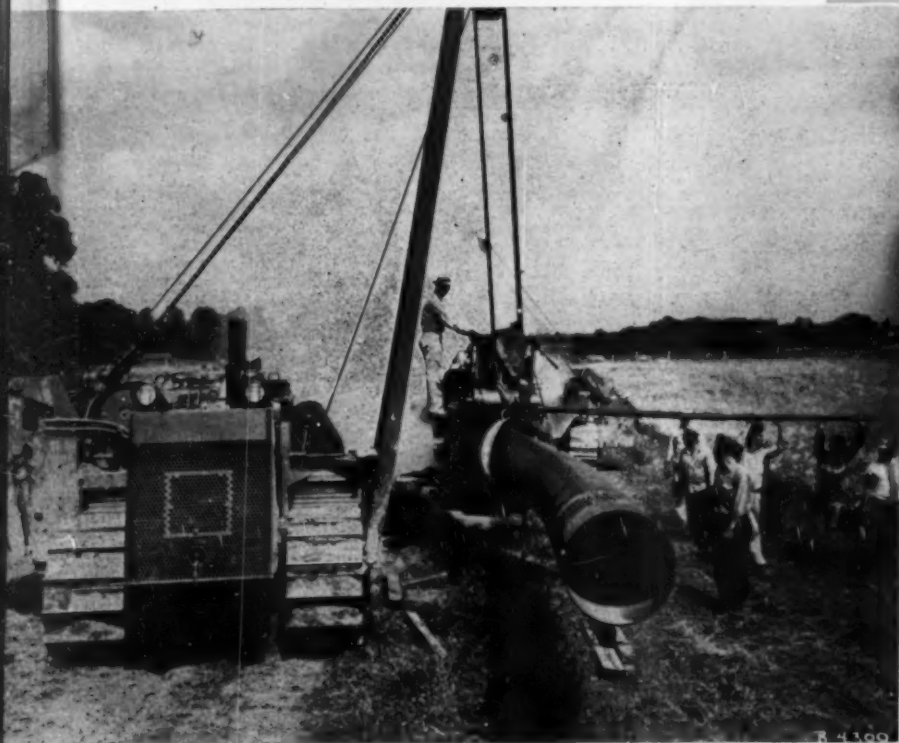
Simultaneously, the company was assembling new equipment for the entire spread. A dozen crawler tractors were purchased. Two International TD-24 crawlers with Superior booms, six International TD-18A crawlers with Superior booms and Bucyrus-Erie angle dozers, and four International TD-14A crawlers, two with Superior booms and two with Bucyrus-Erie bulldozers, were delivered. A wrapping machine was purchased and a C.R.C. pipe bending machine and a cleaning and wrapping machine were rented.

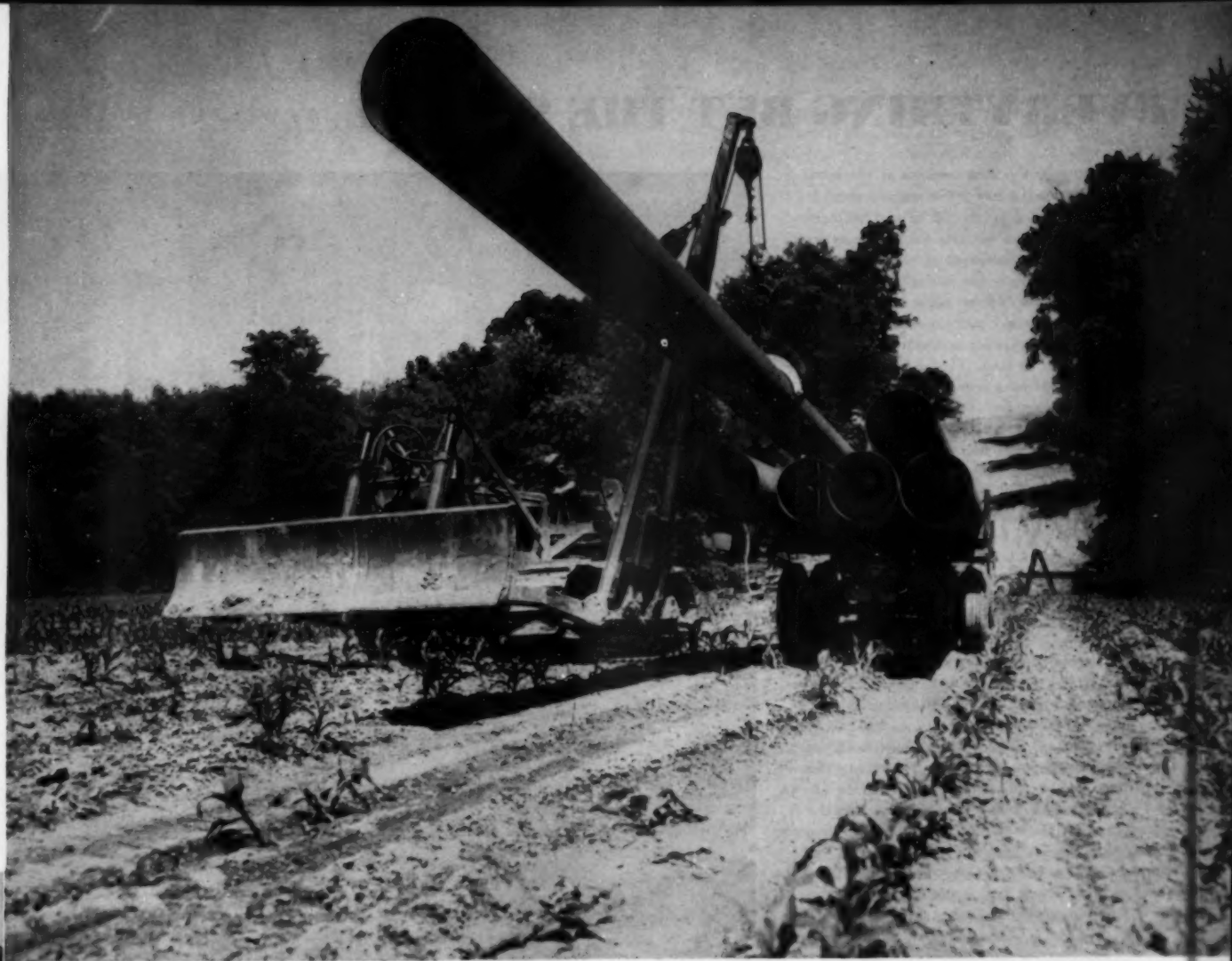
Once work on the 22-inch line was underway, the new crew improved each day and has been averaging three-quarters of a mile of pipe a day under ordinary working conditions. However, laying the

last few miles of the line leading into South Bend will provide the ultimate test for the crew, company officials predict. The right of way there goes through a six mile slough near the Studebaker plant and both excavation and pipelaying may have to be done from barges.

While this project is expected to be completed by mid-October, an estimated 40,000 home owners must wait until the Texas-to-Illinois transmission line is completed on Jan. 1, 1952, before converting their heating systems over to the new fuel. As soon as the last length of 22-inch pipe goes into the trench, this same crew will be introduced to king-size pipe of the 36-inch variety on the company's next project which will extend from the Illinois state line to the Aetna sub-station in Gary, Ind. The company hopes to have six miles of this line in place before cold weather puts the lid on pipelaying for the winter. The job will be opened up again next spring and completed at that time.

**WRAPPING IT UP . . .** With the front end section of the pipe being cradled by the TD-18A boom tractor, the wrapping machine inches its way along the big tube. **To the right: DOWN SHE GOES . . .** Several hundred feet of wrapped pipe are lowered in by International TD-18A and TD-24 boom tractors.





**STRINGING ALONG . . .** The 22-inch pipe is picked off the truck by the TD-18A operator who uses a tong attachment on the side boom to speed the string operation.

**COVER UP JOB . . .** A big blade of dirt goes spewing into the trench as an International TD-18A and dozer handle the cleanup job.



# EVERYTHING BUT THE SQUEAL By WILBUR W. YOUNG

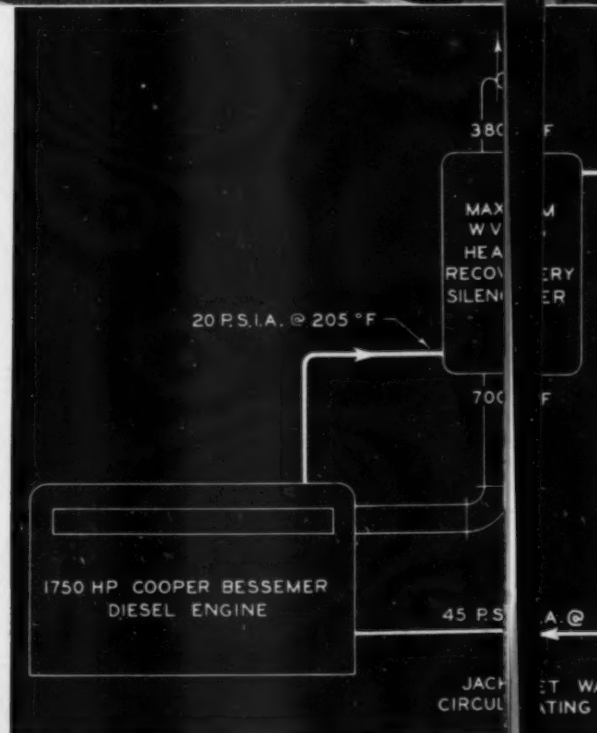
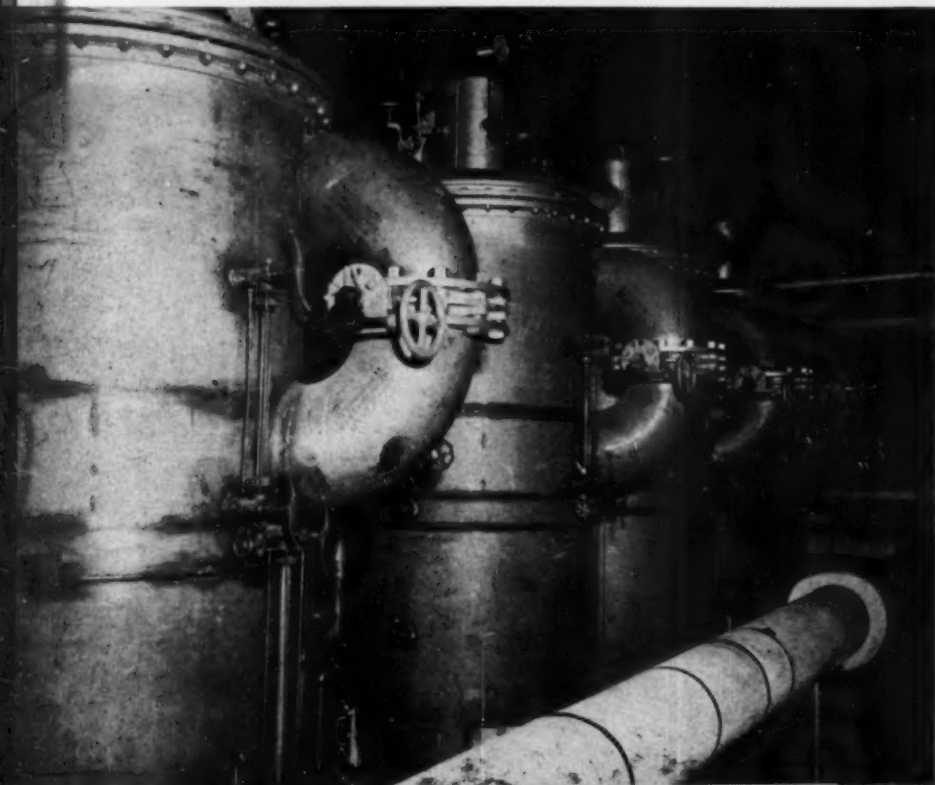
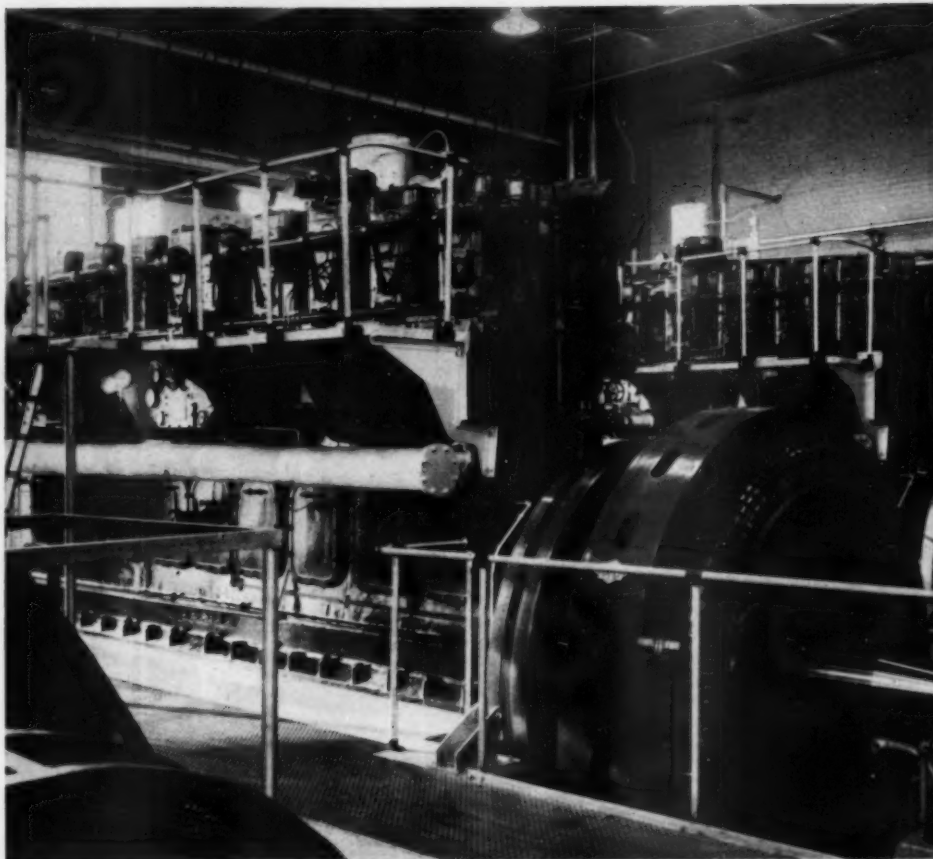
**E**VEN though the diesel engine is the most efficient prime mover yet developed there is still much concern over the 60 to 65% of heat released from the fuel it burns that produces no useful work—in most installations. Higher outputs are obtained from given sizes of engines by various means, but the heat balance stays essentially the same unless the 60 odd percent of the heat that is carried off in the jacket water and exhaust is captured and put to work. This article deals with an engine and its heat recovery system that gets about all of the heat that is gettable, like the meat packing industry processes all of the pig—all but the squeal. In this case the squeal is represented by some 20% unreclaimed heat—instead of 65% as is the case where jacket and exhaust heat is totally wasted.

The International Latex Corporation, Playtex Park, Dover, Delaware, uses large amounts of power and steam in its processes. For power requirements they have installed three Cooper-Bessemer diesels. Two of them are Model LS-8, naturally aspirated units of 8 cylinders each, 15½ in. bore, 22 in. stroke, rated 1030 hp. at 327 rpm. They drive Electric Machinery 1000 kw. generators.

Note: Oversize generators were installed with the idea of supercharging these two engines later. The third engine installed about a year ago is an LS-8-T, turbocharged unit of the same size as the other two, but rated 1700 hp. at 327 rpm. driving an Elliott 1200 kw. 2400 volt generator. With this unit the Maxim Silencer Company has installed a heat recovery system that is not only unique but is also producing amazing results.

Four Maxim distillation units comprising two independent evaporator plants which supply distilled water for boiler make-up.

Two Cooper-Bessemer LS-8, 1030 hp., 327 rpm., diesels and Electric Machinery 1000 kw. generator at plant of International Latex Corp., Dover, Del.



The physical makeup of this heat recovery system consists of a waste heat boiler, which is actually a heat recovery exhaust silencer, a cyclonic separator and two double effect evaporator distiller plants, all designed and constructed by Maxim. Now let us see how this is all hooked up and to what purpose. First, as mentioned above, the manufacturing processes of this plant require large quantities of steam and since this steam is wasted in the processes it cannot be returned to the boiler as condensate. Therefore large quantities of boiler makeup water are needed and this makeup water must be pure. So the object of this heat recovery system is to produce distilled water for boiler makeup, and for certain plant processes, thus turning into useful work some 40% of the total heat released from the engine fuel, in addition to the work performed by the engine.

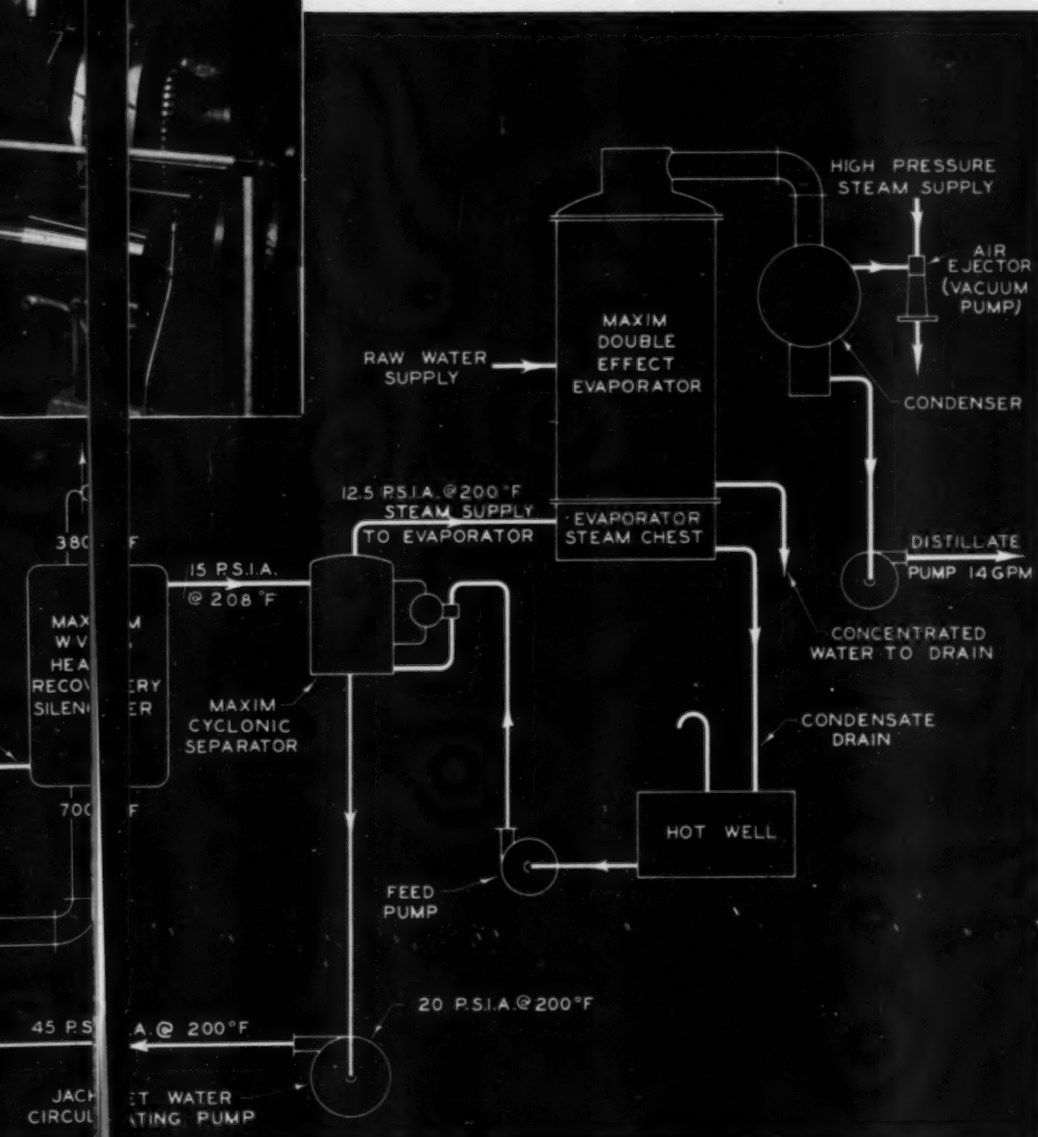
Surprise No. 1: This system is predicated on high temperature engine cooling, actual jacket temperature being a function of engine load. At the

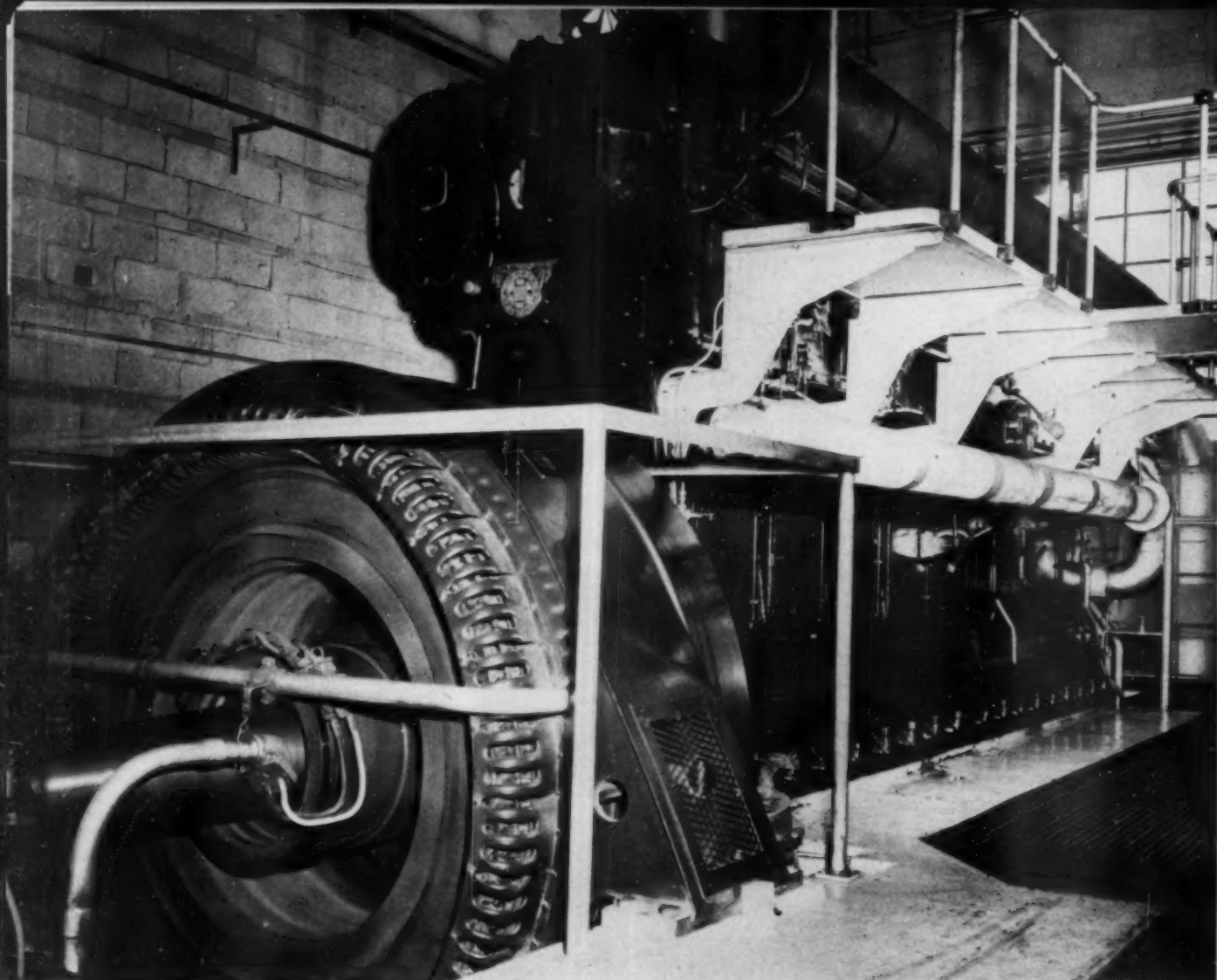
present time the engine load is considerably less than rating, swinging between 600 and 800 kw. and jacket water leaves the engine at 205 degrees F. From the jacket outlet the water goes directly to the waste heat boiler (heat recovery exhaust silencer) where the water temperature is raised 3 degrees F. Outlet temperature from the waste heat boiler is therefore 208 degrees F. The water is then flashed to steam in the cyclonic separator, which is under a vacuum, and the steam is passed to the evaporator plant. And that is where the ultimate purpose of this system is accomplished.

The evaporator plant consists of two pairs of evaporator units operating in parallel. Each pair of units is a first and second effect (a double effect evaporator produces twice as much distillate as a single effect, while using the same amount of steam). Each pair of evaporators is a complete distillation unit and can be operated independently of the other plant. In the first effect evaporators the steam produced by flashing the engine jacket water in the cyclonic separator is condensed by transmitting its heat to raw feed water taken from the cooling tower. Formation of steam in the first effect, by heat transmitted from the engine jacket water to this raw feed water, absorbs all the heat salvaged from the engine jacket water and from the exhaust heat recovery silencer. Steam is formed at considerably under atmospheric steam formation temperatures, as there is a vacuum pulled on the secondary side of the first effect evaporator. The steam formed in the first effect evaporator transmits part of its heat to the feed water used in the same evaporator, and then flows into the primary side of the second effect evaporator. This steam then condenses in the primary side of the second effect evaporator as it transmits its heat to the raw feed water in the secondary side of the second effect evaporator. Again steam is formed at a still lower temperature than in the first effect evaporator due to the vacuum pulled on the secondary side of the second effect evaporator, and this steam is led to a condenser. The total distilled water output of the system is the sum of the condensation of steam from the first effect evaporator which is condensed in the primary side of the second effect evaporator, plus the steam formed in the secondary side of the second effect evaporator which is condensed in a normal shell and tube condenser. This multiple effect condensation is the reason for the high distilled water output of the system. In each unit, therefore, steam is formed directly from raw feed water from the cooling tower.

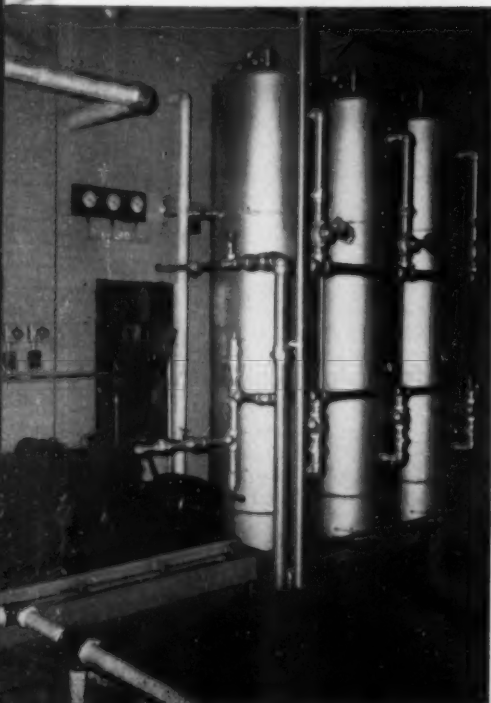
We therefore have in effect a closed engine jacket cooling system albeit the water follows a devious circuit. With 630 gpm. of jacket water passing through the engine, 8 gpm. or 1.27% of the water is flashed to steam, is then fed to the evaporators, is condensed and returned to the engine with the other 622 gpm., to repeat the cycle. Under design conditions, with the engine operating at full load (1200 kw.), it is possible to produce 22,500 gallons of distilled water per day (24 hours), utilizing heat that would otherwise be wasted. Under present operating conditions the engine load is 600 to 800 kw., and the production of distilled water is in the order of 12,000 gallons per day (24 hours).

Flow diagram of the engine jacket and exhaust heat recovery system capable of producing 22,500 gallons of distilled water per day (24 hours), for boiler make-up.





Quincy air compressor and air storage bottles in International Latex plant at Dover, Del.



The absence of an oil-fired boiler to generate a like amount of steam results in large savings.

The following heat balance is worked out from observed data with the engine operating at 1000 kw. load. Total heat input will vary for different load conditions as will relative values for distribution of the heat released, but corresponding percentages will remain essentially the same.

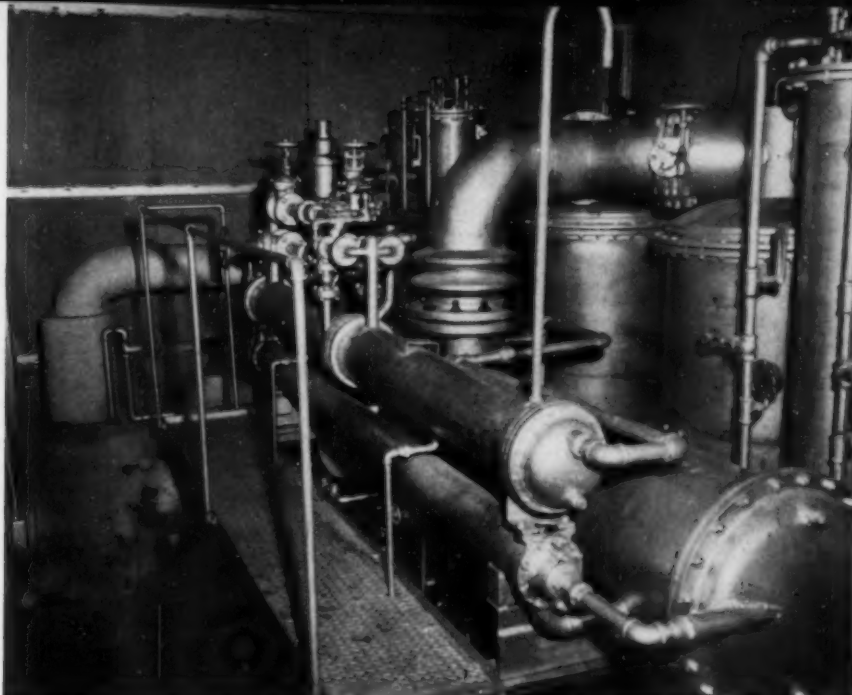
Total Heat Input		
(low heat value)	9,400,000 Btu./hr.	100%
Work out of Engine	3,820,000 Btu./hr.	40+%
Heat absorption:		
Jackets	2,000,000 Btu./hr.	21+%
Exhaust	1,700,000 Btu./hr.	18%
Total heat used	7,520,000 Btu./hr.	80%
Heat Unreclaimed	1,880,000 Btu./hr.	20%
Total Heat Rejected	9,400,000 Btu./hr.	100%

Only 20% of the total heat input is wasted, so with the engine operating at 40% thermal efficiency, the heat recovery system accounts for another 40% of the total heat input making the overall plant thermal efficiency 80%.

Heat recovery-consciousness started at Interna-

Cooper-Besemer LS-8-T, 1700 hp., 327 rpm. turbocharged diesel direct connected to Elliott 1200 kw. generator. The latest engine installed at the Dover, Del. plant of International Latex Corp.

tional Latex with the first two Cooper-Besemer diesels which were installed with Maxim heat recovery silencers for heating boiler feed water. With the addition of the third and largest engine, Latex and Cooper-Besemer engineers realized the full possibilities of heat recovery, and planned an installation that may well be the forerunner in an intensified effort to conserve our vital oil supplies.



### List of Equipment

Engines: Cooper-Bessemer; Two Model LS-8, 1030 hp. at 327 rpm. naturally aspirated. One Model LS-8-T, 1700 hp. at 327 rpm. equipped with Cooper-Bessemer Turbocharger.

Generators: Two Electric Machinery 1000 kw. One Elliott 1200 kw.

Fuel Injection: Cooper-Bessemer.

Pyrometers: Two Bristol Marine Type. One Alnor.

Tachometer: Weston.

Alarm Switches: Fulton Sylphon on engine lube and Turbocharger lube.

Heat Recovery Silencers: Maxim Silencer Co.

Evaporators: Maxim Silencer Co.

Cyclonic Separator: Maxim Silencer Co.

Cooling Tower: Marley Co.

Governors: Three Woodward.

Fuel Filters: Three Hoffman Fullers Earth Type for initial filtration and three engine-mounted Commercial filters for final filtration.

Fuel Transfer Pumps: Weinman.

Lube Oil Reclaimers: Three Honan-Crane continuous units and three Nugent duplex proportioning filters on engine return line.

Final lube Filtration: Three Cuno triplex.

Turbocharger Lube Filter: Nugent duplex full-flow.

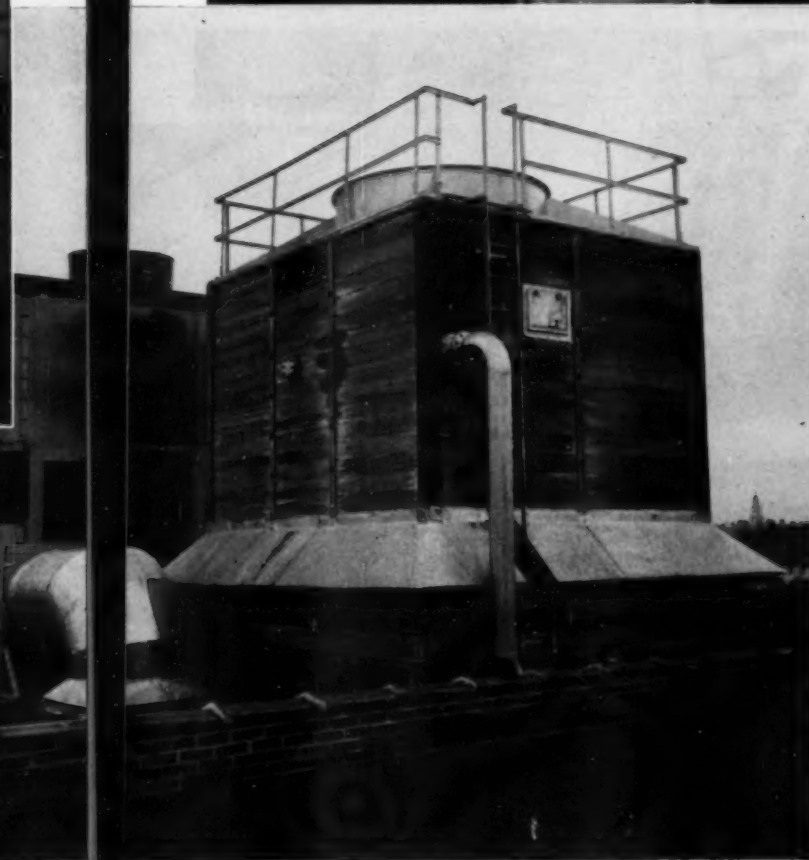
Jacket Water Coolers: Three Ross (one is a stand-by on the new engine).

Lube Oil Coolers: Three Ross.

Distilled Water Condensers: Ross.

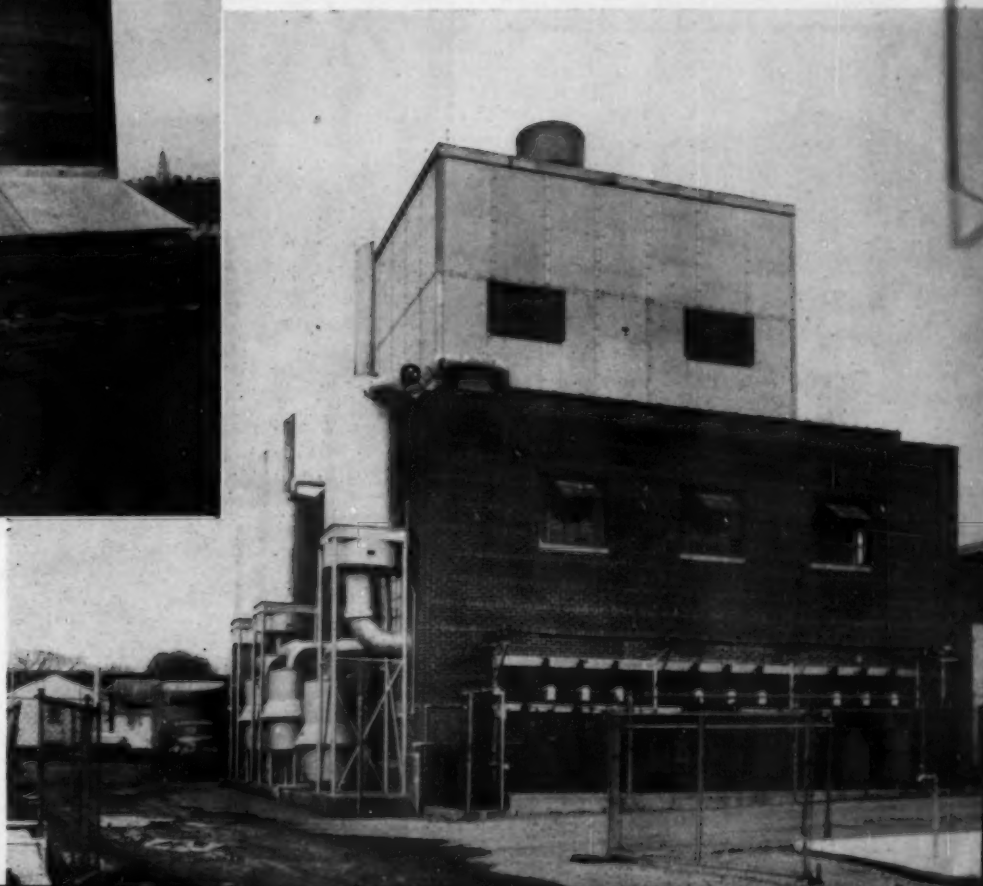
Temperature Regulating Valves: Four Fulton Sylphon on two sets of jacket water and lube coolers. Two Powers Regulator on jacket water and lube coolers for new engine.

Lower left is the Maxim cyclonic separator in which jacket water is flashed to steam. Two effects of the Maxim evaporator are seen to the right.



Marley cooling tower for the diesel power plant of the International Latex Corp.

Maxim heat recovery exhaust silencers and American Cycoil intake air cleaners outside the power plant. Penthouse contains the cyclonic separator and distillation units.



# DIESELIZED SISTERS

## THE "ECUADOR" AND THE "EQUATOR"

By JAMES JOSEPH

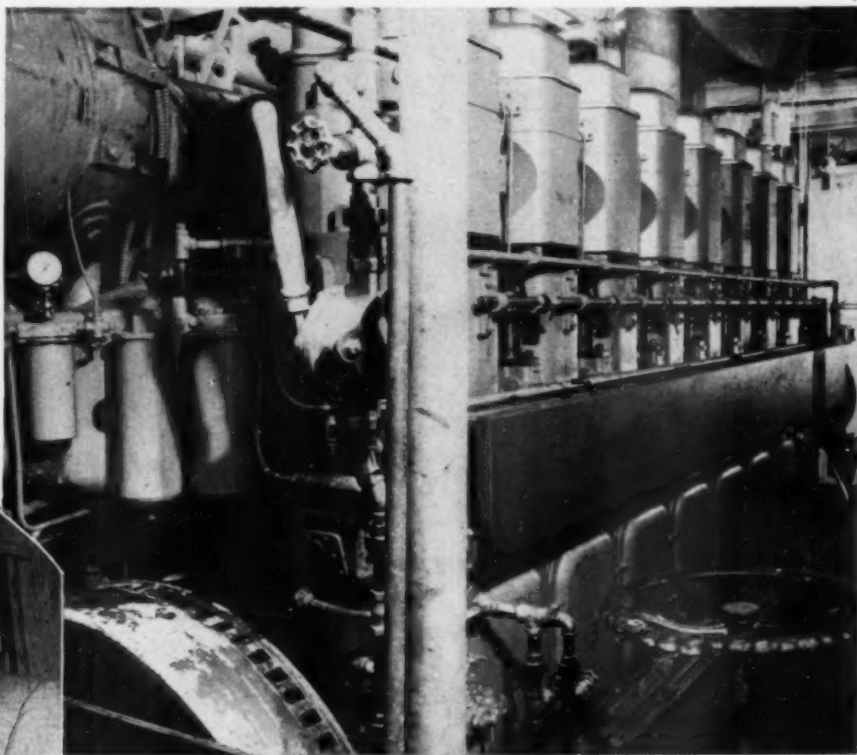
**M**ANY an old tuna man declares that M. O. Medina, managing owner of the dieselized twin-sisters—the *Ecuador* and *Equator*—was the granddaddy of the present-day big tuna clipper. No one claims that Medina designed the bigger, better, more economical clipper ship. But they do say that Medina, as early as 1926, risked his capital in building the *Atlantic*, a 110-ft., 110-ton capacity tuna boat. Before that, the average tuna clipper ran about 50 tons capacity, and many as small as 10 to 12 tons. But it was Medina's *Atlantic*—a huge clipper in its day—that led the way, not only to bigger payloads but to bigger diesel engines. Today, besides managing the twin sisters *Ecuador* and *Equator*, Medina has a hand in some four other tuna ships, among them the 160-ft., 450-ton capacity *Normandie*, one of the fleet's largest. Nattily dressed, cigar-chewing Medina has been around clippers most of his life, and in 1949 was president of the American Tuna Boat Owner Association.

Launched in Dec. 1951, the clipper *Ecuador* has now departed on its maiden voyage and was in Panamanian waters when DIESEL PROGRESS' correspondent went aboard the *Equator* which was testing its compass in San Diego Bay. Both the *Ecuador* and *Equator* are exactly alike—from stem to stern. Both have an overall length of 138-ft. 3-in.; a molded beam of 31-ft. 4-in. Each will pack approximately 425 tons of fish in 12 wells and 3 compartment bait boxes. Six wells are below deck,

3 above, and like most tuna clippers running against the rising tide of shattered markets, the return trip sees every available space crammed with catch, and that goes for the bait boxes, no longer needed on the return voyage.

The *Ecuador* and *Equator* are powered by an Enterprise DMG 38 diesel engine, single acting, direct reversible, 4 cycle, 12-inch x 15-inch 490 rpm. The engines are supercharged to provide 925 bhp. driving a 96-inch propeller through a 2:1 reduction gear. Winslow full flow lube oil and fuel oil filters are used on each main diesel. Also Ross oil coolers and jacket water heat exchangers. Standard of California supply both fuel and lube

oil. A pair of Quincy air compressors supply air on each ship. Auxiliaries for both clippers include 2 Murphy diesels, 6 cylinder, 158 hp. Model 21, with Columbia 120 kw. 115 volt d.c. generators, and a GMC diesel Model 6-71, 90 hp. with a 60 Kurz and Root 60 kw. 115 volt d.c. generator. The hulls of both clippers are wooden, made with 3-inch planking and 4-inch ceiling. The bait boxes and all of the brine wells are lined with ¼-inch thick steel plate insulated with cork. The vessels have Sperry automatic steering systems, both remotely controlled from the deck if desired. One of the advantages of the Sperry remote control unit seems to be the pointer knob which shows the captain exactly the position of the rudder at all times.



925 hp. supercharged Enterprise with Winslow full flow filters on board the *Ecuador* and *Equator*.

Mr. M. O. Medina, managing owner of the *Ecuador* and *Equator*.

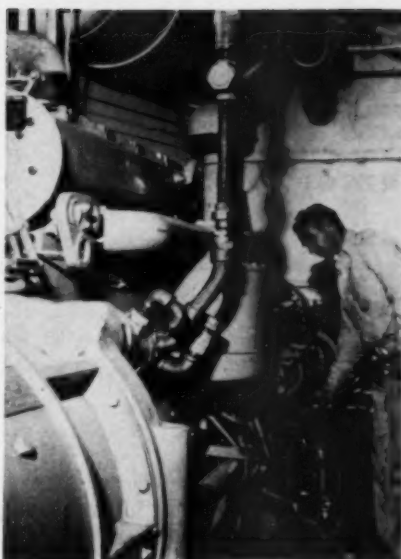


Push-button remote control systems don't give this advantage.

Captain of the *Ecuador* is Capt. Eugene Cabral, who has held his master's papers since 1944. Capt. Esmael Virissimo is skipper of the clipper *Equator*. Both clippers have monel tailshafts, 7½-inch diameter, with three blades, and pitched 74 x 95-inch diameter. The propellers are Lambie-made.

Refrigeration equipment on the two boats differs slightly. The *Equator* for example has four 6-inch x 6-inch Kohlenberger ammonia compressors, while the *Ecuador* has installed five units: four 6 x 6 Kohlenberger ammonia compressors and one 3 x 3 Kohlenberger. Both clippers have an approximate cruising speed of 11.5 knots, and both have a fuel oil capacity of 60,000 gallons. Lube oil capacity is 1700 gallons, and approximate cruising range is estimated at 20,000 miles. Fresh water storage capacity (water maker) for both is 1500 gallons.

Crew's quarters sleep 19, and the galleys of both of these modern clippers are streamlined and ship-shape, with a 125 cu. ft. refrigerated galley day box and a 600 cu. ft. refrigerated stores box. Galley equipment includes an Ingle Range, an electric coffee maker, stainless steel drainboard, meat block and other features, all built in. The floor covering is of magnasite.

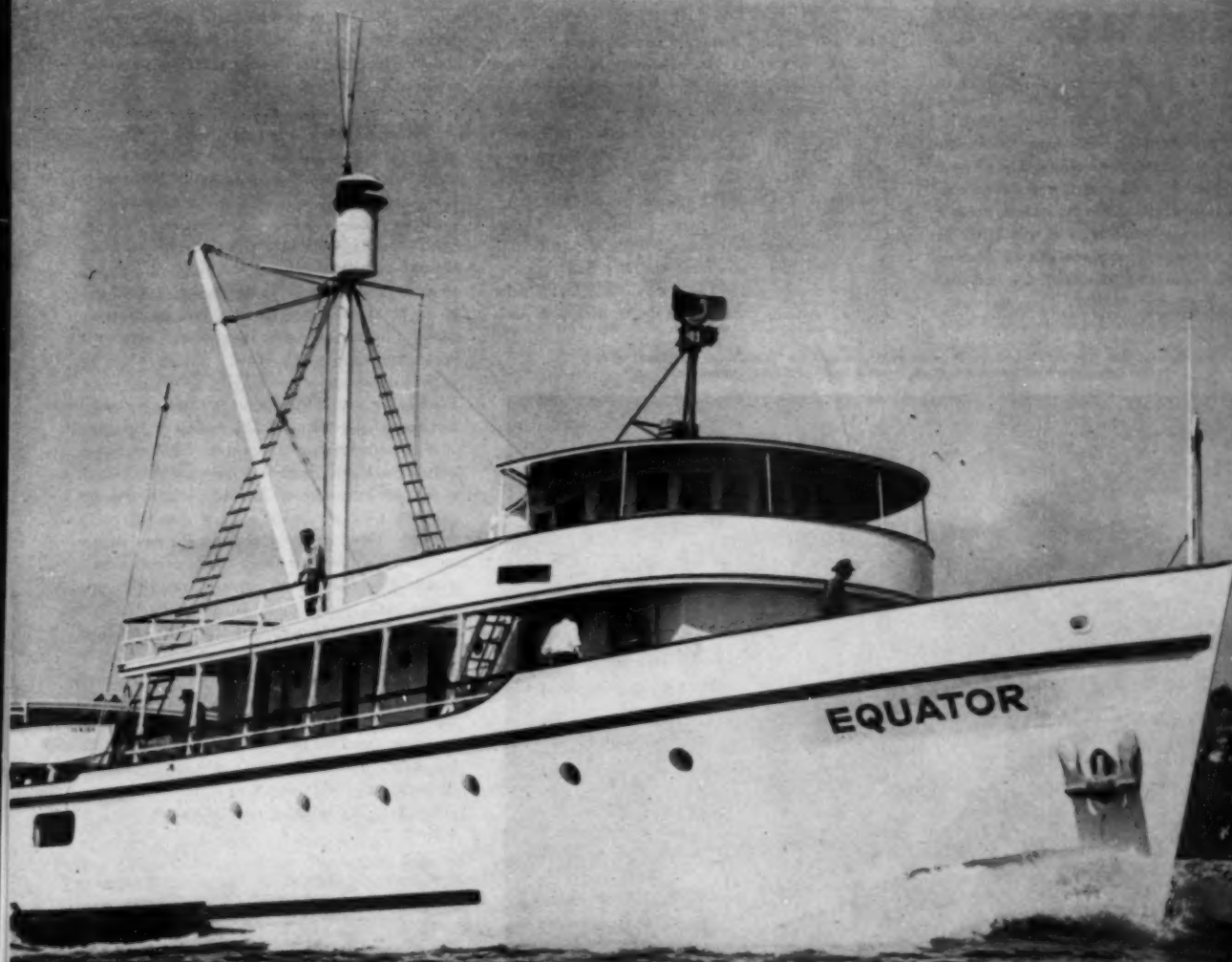


One of the engine room crew and the Murphy auxiliary diesel. There are two such units aboard each of these two fine ships.

Each clipper has 13 pumps installed, for various purposes. There are three, 10-inch Fairbanks-Morse bait pumps, 2 hp., and ten 3-inch Fairbanks-Morse brine pumps, 3 hp. Both ships carry an 18-ft. Driscott tuna tender boat.

The *Equator* and the *Ecuador* are products of the National Steel and Shipbuilding Corp. yards in San Diego, and were designed by Omar G. Schmidt. The clippers have 2-inch Fairbanks-Morse oil transfer pumps, Ross heat exchanger and two Fairbanks-Morse 2½ x 2, 5 hp. cooling water pumps. The two engine exhaust water makers (supplied by Diesel Technical Supply Service) are combined with 1500 gal. storage capacity. Auxiliary engines are equipped with Maxim silencers.

Right now the *Equator* is waiting authority to make its second voyage. As the *Ecuador* slid down the ways back in December to join the *Equator* owner-manager M. O. Medina was no doubt thinking how the modern, big fish-capacity, dieselized clipper is one of today's most economical fishing boats afloat, and how, with pioneering on his part, even at the risk of capital loss, he contracted the first really big clipper back in 1926. As the saying goes, a lot of keels have been laid and a lot of husky diesels installed since then, and tuna fishing has become, in the meantime, the fourth ranking industry in California.



# OSAWATOMIE, KANSAS

**New Nordberg Duafuel Engine, in Almost Continuous Operation, Saves Kansas Community \$20,000 a Year**

By JAMES J. HIGGINS\*

**I**T is interesting to note the tremendous effect that one new engine can have on the operating costs and methods of a power plant. In the Osa-watomie, Kansas, municipal power plant, for ex-ample, the installation of one 1750 hp. Nordberg Duafuel engine in June, 1950 cut fuel costs in half with cash savings at the rate of more than \$20,000 a year. Burning natural gas with a small quantity of pilot oil, the new engine has produced power at a total fuel cost of just 2.87 mills per kwh.

If you look up the census figures, you picture Osa-watomie as a community that has grown but little in 20 years. Nothing could be farther from the truth. City population may be only 4,300, but this is a prosperous, progressive municipality with large and expanding employment rolls. Large numbers come every day from suburban areas and neigh-boring small towns to work in Osa-watomie. A divi-sion point on the Missouri Pacific Railroad, this is the site of a new million-dollar diesel main-tenance shop, one of three in the Mopac system. More than 1,250 men work in the local railroad shop. This is the site of a state hospital which employs 400. This is the center of a rich agricul-tural area. The employment level is high and does not fluctuate.

Evidence of prosperity is everywhere. There is a high percentage of new automobiles. The city has a 135-acre park with lake and golf course and there is a stadium and a 10-acre athletic field. A \$400,000 municipal building was completed re-cently. The new municipal power plant is both an evidence and a source of prosperity. Located high

\*Supt. Osa-watomie Municipal Power Plant.

on the grassy plateau in John Brown Park, the brick and stone structure is an attractive and im-pressive public building. The engines housed in the plant have been a consistent source of substan-tial income to the city. Net profits in the past decade have been well over \$300,000.

The city has owned its electric utility since 1913 with steam power equipment carrying the load from 1914 to 1928. The first of the engines now in the plant, an 800 hp. McIntosh & Seymour air-injection diesel, began operation in January, 1928, followed two years later by an 800 hp. Worthing-ton air-injection unit. In 1935, a 600 hp. McIntosh & Seymour mechanical-injection diesel went into service. At its old site, the plant had been flooded twice, once in 1928 when 54 inches of water shut down the steam plant for good, and once in 1935 when operators managed to keep the generators dry by working hand pumps. In 1939, it was decided to move to higher ground and a new power plant was built.

The city's fourth engine, put into service on June 18, 1950, is a four-cycle, supercharged Nordberg Duafuel with eight cylinders of 16 inch bore and 22 inch stroke developing 1,750 hp. at 327 rpm. The engine drives a 1,235 kw. 3 phase, 60 cycle, 2400 volt Elliott generator with chain-driven ex-citer. With peaks rising (to 1450 kw. in 1950), the new engine was required to meet the demand. But fuel costs were another major consideration. Even with its location near the oil fields, the price of diesel fuel had risen until the city had to pay nearly 8 cents a gallon for 28 gravity oil. A Duafuel engine burning cheap natural gas promised im-

portant savings. The new engine, most efficient unit in the plant as a diesel, most economical unit as either a diesel or a Duafuel, was assigned the lion's share of the work. In 11 months of opera-tion, the Nordberg ran 7,948 hours out of a possible 8,040—98.8 per cent of the time. In that period, the engine produced 5,452,300 kwh. of the plant's total of 5,535,150 kwh.—98.5 per cent of total pro-duction. On some occasions gas was not available and the Nordberg ran as a diesel. Here is how the generation total was divided:

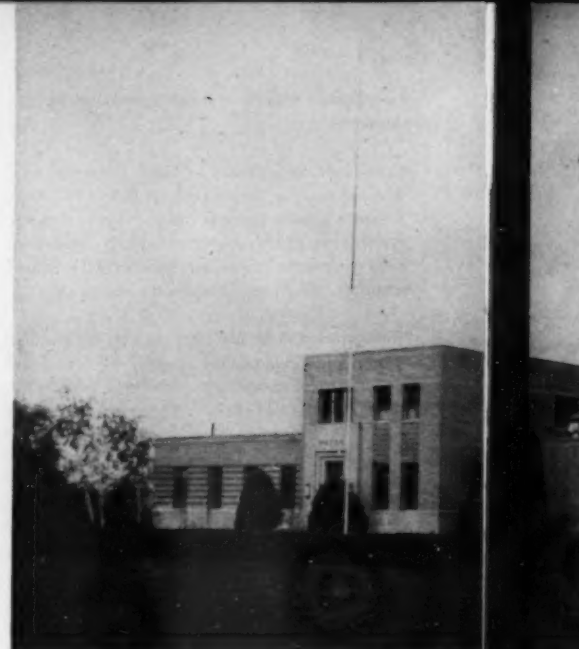
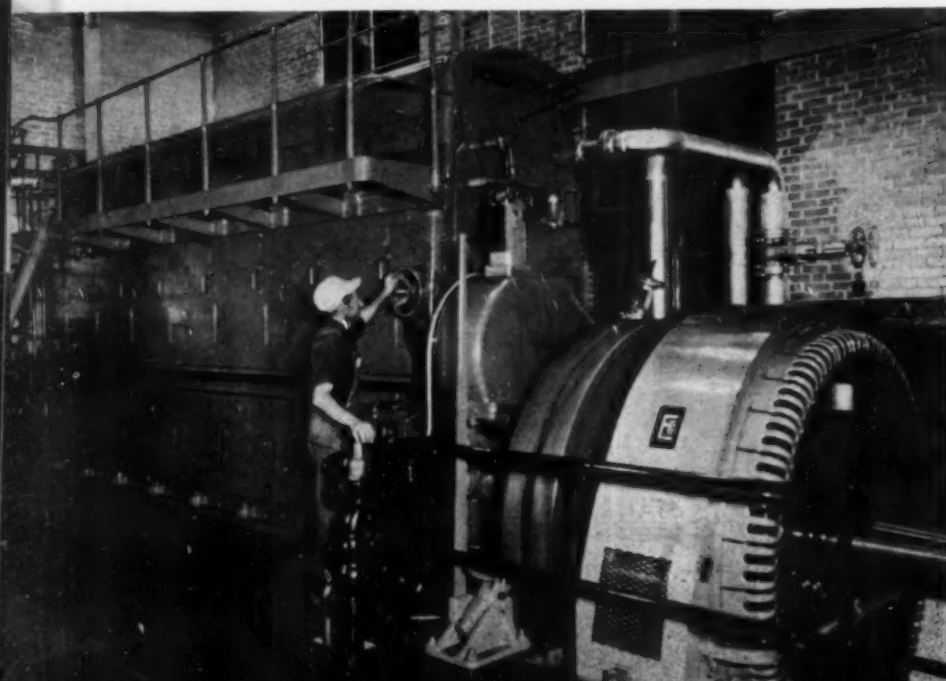
Nordberg as a Duafuel.....	4,573,500 kwh.
Nordberg as a Diesel.....	878,800 kwh.
Other Diesels.....	82,850 kwh.
Total Plant.....	5,535,150 kwh.

For Duafuel operation, the engine consumed 56,894 mcf. of natural gas and 31,539 gal. of pilot oil, an average of 12.44 cu. ft. of gas and 0.00689 gal. of oil per kwh. It should be noted that this in-cludes a lot of late night operation at very poor load factor.

Translating fuel consumption into costs per kwh., the natural gas cost just 2.25 mills and the pilot oil 0.62 mills for a total fuel cost of 2.87 mills per kwh. As a diesel, the engine consumed 61,028 gal. of fuel oil in producing 878,800 kwh., an average of 14.61 kwh. per gal. Fuel cost was 6.25 mills per kwh. To appraise the effect of the new engine on plant costs, we can use as a base period the six months (December 1949 through May 1950) pre-ceding installation of the Duafuel unit. In that period, the diesels produced 2,681,710 kwh. and consumed 210,490 gal. of fuel at a cost of \$18,506.01. This averages 12.74 kwh. per gal. of fuel at a cost of 6.90 mills per kwh. The Duafuel pro-duction at 2.87 mills means a saving of 4.03 mills per kwh. Based on the 11-month output of 4,573,500 kwh., this saving totals \$18,431.20. Savings through superior efficiency as a diesel added an-other \$571.22, bringing the 11-month total to \$19,002.42.

Instantaneous manual or automatic changeover from Duafuel to Diesel operation obviously is an

This view of the 1750 hp. Nordberg Duafuel engine shows the Woodward governor, with its linkage to both gas and fuel oil systems, and the Elliott generator.





important advantage in this plant. When set to operation as a Duafuel, the engine receives natural gas at 13 p.s.i. with the quantity admitted to the cylinders regulated by the governor. The regular fuel injection pumps supply constant charges of pilot oil. If the gas supply fails, the engine switches automatically to full oil operation. Normally, the pumps are adjusted to deliver pilot oil with about 7 per cent of total heat energy requirements.

The Nordberg Duafuel engine also has effected economies in lubrication and maintenance. An average of 165 gal. of lubricating oil fed to the cylinders through forcefeed mechanical lubricators each month of continuous operation. Some of this oil drains down to the crankcase making it necessary to remove an average of 55 gal. of oil a month to keep the crankcase supply down to the desired level. Needless to say, no new oil is added to the crankcase under these circumstances. A motor-driven pump takes oil from this sump at the rate of 360 gph. and puts it through a cellulose-type filter from which it returns to the sump. Engine and oil stay clean and it has not been necessary to discard any lube oil. The plant also has an oil reclaimer for use in the event of water or fuel dilution. Thus far, it has not been used on the Nordberg unit. The lubricating oil consumption cited means a level of better than 11,000 rated hp. hr. per gal.

It is plant practice to pull pistons on the diesels once a year for routine overhaul but, even after 7,948 hours of service, no such overhaul is contemplated for the Duafuel. In all probability, the engine will continue its almost continuous operation until the next plant enlargement. This plant has a simple and economical cooling water system. Motor-driven centrifugal pumps circulate soft water through the engine jackets and a pair of heat exchangers. River water on its way to the adjoining city water plant passes through the exchangers to cool the jacket supply. To help carry the load in hot weather, the city recently installed a dry-surface cooler through which part of the jacket water can be directed. Rated at 600 hp.,

this cooler has handled 900 hp. on test. The economy-minded plant derives a little extra dividend by using Duafuel exhaust heat to warm the power and water plants in winter. A pair of motor-driven blowers force air through the silencer chambers and through ducts to the two buildings. Two 33,000 cfm. fans at roof level exhaust hot air during the summer.

In its power development program, Osawatomic has had the benefit of a highly trained staff, building soundly but imaginatively on the solid base of long, successful experience. Chief Engineer N. L. Shriver is responsible for the excellent condition of the plant equipment, under the supervision of the writer who has been associated with the plant for over 33 years. City Engineer Harvey Earp has held that post for 25 years and City Clerk R. A. Hanfield, who plans an important part in financial management of the department, has been in office 16 years. The elective policy-making group has had somewhat shorter tenure but they too have held office enough years to weld an effective man-

agement team. Mayor A. J. Lockhart has served nine years, Finance Commissioner Karl E. Cole eight years, and Utilities Commissioner H. H. Rayle seven years.

Osawatomic is growing steadily in business activity and in consumption of electric power. Demand is higher than ever in the expanded Mopac shops, the commercial establishments with increased modern lighting, in the homes with electric appliances and TV sets, on the farms along the 600 miles of rural line served by the plant. The municipal power plant is meeting this demand with the greatest efficiency in the plant history. City officials, however, foresee the time when the existing facilities will no longer be able to adequately handle this steadily increasing demand. As a result, an order has been placed for a similar Nordberg Duafuel engine. This 1750 hp. unit is scheduled for installation in early 1952.

### List of Equipment

Engine—One four-cycle, 1,750 hp. eight cylinder, 16 x 22 in., supercharged Duafuel engine operating at 327 rpm. Nordberg Mfg. Co.  
 Generator—Elliott Co.  
 Pilot Oil—Co-op Refinery.  
 Natural Gas—Cities Service Co.  
 Fuel Meter—Neptune Meter Co.  
 Fuel Filter—Wm. W. Nugent & Co., Inc.  
 Centrifuge—DeLaval.  
 Lube Oil—Cylinders: Standard HD. Standard Oil Co. (Indiana). Crankcase: White Eagle #40. Socony-Vacuum.  
 Lube Oil Reclaimer—Youngstown Miller Co., Inc.  
 Lube Filter—U. S. Hoffman Machinery Corp.  
 Lube Oil Cooler—Ross Heater & Mfg. Co., Inc.  
 Auxiliary Lube Pump—Blackmer.  
 Heat Exchanger—Ross Heater & Mfg. Co., Inc.  
 Cooling Water Pumps—Allis-Chalmers.  
 Dry Surface Cooler—The Marley Co.  
 Air Filters—Agitair. Air Devices, Inc.  
 Exhaust Silencer—Maxim Silencer Co.  
 Supercharger—Elliott Co.  
 Air Compressor—Gardner-Denver Co.  
 Alarms—Viking Instruments, Inc.  
 Pyrometer—Alnor. Illinois Testing Laboratories.  
 Governor—Woodward Governor Co.

A new element in the plant's cooling system is this Marley dry-surface cooling through which part of the jacket water is circulated. Though rated at 600 hp. this cooler has handled up to 900 hp. on test.



# KEEPING YOUR FRUIT COLD

By DOUGLAS SHEARING

**T**HE Frigidaire, Detroit Diesel Engine and the Delco Products Divisions of General Motors are currently building railway mechanical refrigerating equipment for The Fruit Growers Express Company (one of the largest U. S. Railroad handlers of fresh fruits and frozen juice concentrates), that promises to revolutionize refrigerator-car cooling. These companies are well on the way to long-needed answers to some vexing problems of refrigerating these vital health-giving foods while in transit to many buyers across the nation. Their solution consists of a mechanically refrigerated car capable of sustaining temperatures of zero for weeks at a time. This method is much more ideal since there isn't the delay and bother of re-icing at twenty-four hour intervals and also the fact that safe, temperatures of around zero degrees are not attained by the ice and brine method of cooling. America's housewife and food buyers all over the country can count on the frozen fruits, juices and foods they purchase will be preserved without danger of spoilage during shipment in these cars.

The new mechanically refrigerated cars offer many primary advantages including about 90% less refrigerating cost while in transit, considerably fewer car overhauls and an estimated extension of 10 to 12 years of useful life. Since a car overhaul often approaches in cost the original price of the car and since American rolling stock is always in short supply, these two factors alone would repay many times over the differential in original cost of the mechanized equipment. Other advantages are greater efficiency in keeping out heat, automatically controlled, constant temperatures and considerably more useable space in the car than was previously available.

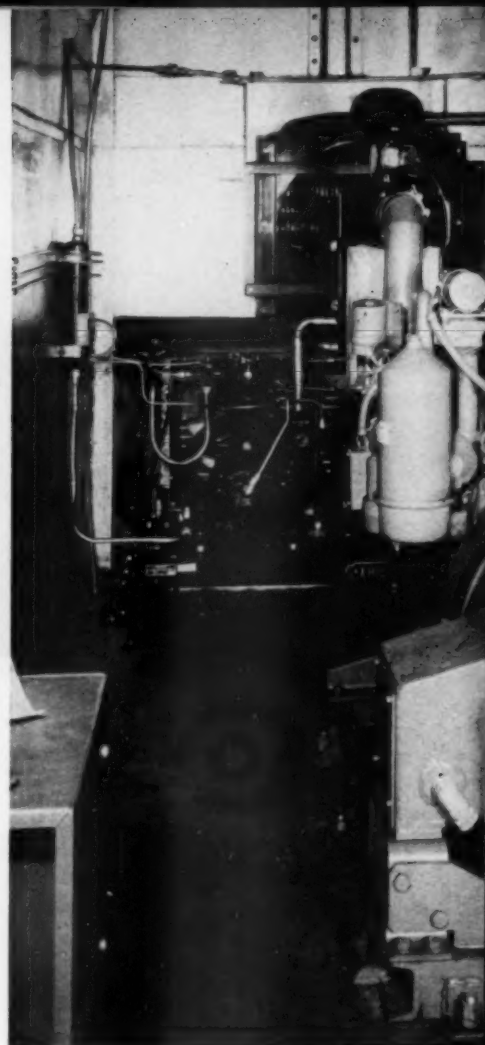
Due to the rapid increase in the use of frozen fruits and vegetables and especially fruit juice concentrates, the shipping agencies have been hard put to keep up with the demand for facilities under the ice and brine method, especially for cargoes that demand temperatures below the freezing point. Present cars must be extensively pre-cooled, carefully iced and salted for such operation; the cargoes themselves are often cooled to -15° to -20° to give them a "start" for their trip. Besides the initial car-pre-cooling, which may be done by blasting cold air through the car, the initial icing of the average refrigerator car requires about 10,000 pounds of ice and 3,000 pounds of salt. Re-icing requires that such cars be cut out of trains at icing stations, placed in a grid of about 24-hour intervals, north and south, east and west, on our railroad networks. Stops at every one of these icing stations may be required according to the cargo and prevailing temperature conditions. Considering the materials and manpower required, this system would have been entirely impractical

were it not for the fact that a carload of concentrated juices may be worth from \$10,000 to \$25,000.

Contrasted to the ice and brine method, the mechanized cars of The Fruit Growers Express Company each use only about eight-tenths of a gallon of fuel oil per hour. On a 10-day trip, as from Hillsboro, Oregon, to Jersey City, N.J.—coast to coast—only about 220 gallons, costing about \$42.00 would be consumed. This is far less than the cost of original icing under the old system. There is also a less obvious but very important savings made when the brine is done away with in these cars. Almost as effectively destructive as acid, the constant drip of salt water has reduced to rust millions of dollars worth of iron and steel in car bodies, trucks, journal boxes, springs, couplings and brake mechanism, to say nothing of the constant deterioration of bridges, rails, plates, spikes, cross-overs and switches on the railroads themselves. Electrically controlled equipment such as switches and signal devices have been particularly vulnerable to the ill effects of brine corrosion. The railroads, therefore, have much to gain by the evolution of a refrigeration system which can replace the salt-and-ice method of cooling refrigerator cars.

Before May 25, 1951, the Fruit Growers Express Company had 52 of these Frigidaire and Detroit Diesel Engine equipped refrigerator cars in service, some for as long as two years, without a single loss of cargo. With a greatly accelerated building program now under way, several hundred may be in operation during 1952. Hand in hand with this accelerated program will be a coordinated service training program conducted by Frigidaire and Detroit Diesel Engine Divisions. The current plan is to attempt extensive service only at strategic points which may be several days apart. Between these points, possibly at each of the present icing stations, men will be stationed to inspect the cars and refrigeration equipment and record gauge readings and temperatures.

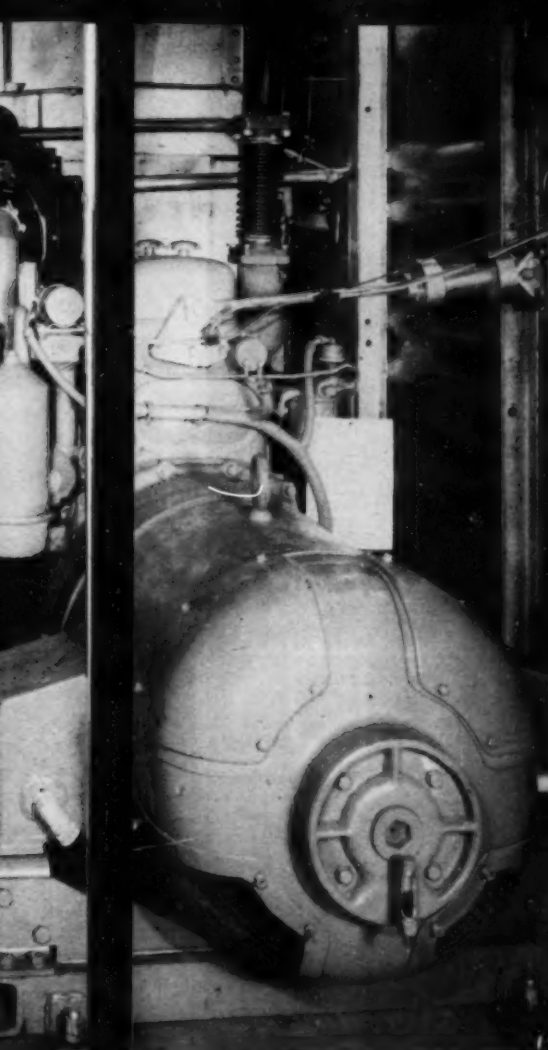
The system consists of a Frigidaire compressor, condenser, cooling coils and a diesel-electric unit to supply the necessary electric power. This unit is a 34 hp. diesel engine, driving a Delco Products 20 kw., 60-cycle, 220-volt, three-phase, alternating current generator, which operates the compressor motor, radiator fan motor, and blower fans. However, it can be quickly and easily plugged into an outside source for operation when the car is being loaded or for long periods of standby operation. Except for the 320 gallon fuel tanks located beneath the car, all of the equipment involved in the refrigeration and power system is located in the compact machine compartment at one end of the car. The cooling coils and blower fans are located atop the machine compartment so that they are in



The refrigerating equipment in the machine compartment of a 40 ft. Fruit Growers Express refrigerated railway car. Right foreground is the 34 hp. combination, Detroit Diesel-Delco Products alternating generator unit and radiator unit fan; under the radiator fan is the Frigidaire compressor.

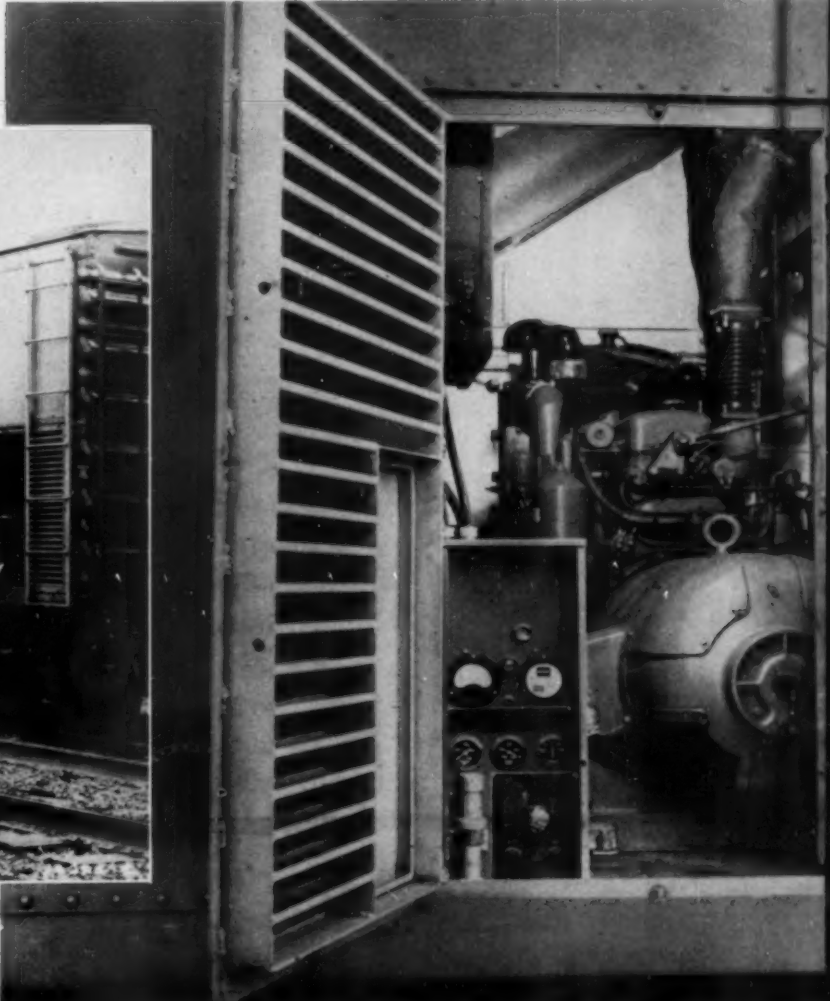
Fruit Growers Express car being checked for a temperature reading and operating performance. The lowered door to the machine compartment opens to reveal the controls and refrigerating compartment. The units can be stopped and started without entering the car. Temperature of the interior can be checked without opening the compartment door by reading a dial thermometer on the outside of the car.

the best position to force the air out into the car above the cargo. The inside of the car is constructed with side wall and floor slats, so that the cargo is actually spaced away from the sides, ends, top, and bottom so as to receive maximum contact from the circulating cold air. Freon-12 is used as the refrigerant. Forty and fifty foot cars are being equipped with these Frigidaire-cooled dieselized systems.



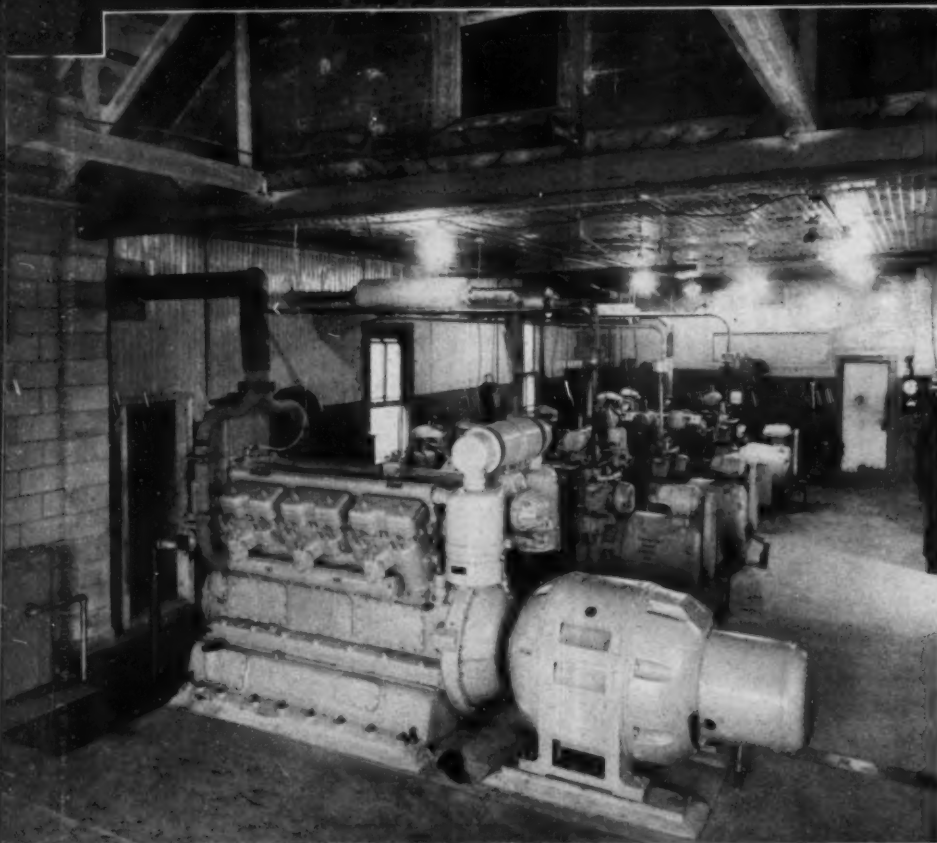
The easy accessibility of the Detroit Diesel-DeKo Products generator set and its controls. Engine and electrical control box is at center and to the left the dial thermometers which register cargo compartment temperatures.

One of the cars partially loaded from wall to wall. Note how slats act as air duct along wall. Floor of the car is constructed in the same manner to provide cold air circulation completely around all sides of the cargo. The Frigidaire cooling unit can be seen in the upper background.



# DIESELS LIGHT SMALL TOWN

By DOUGLAS SHEARING



**W**ELLS Power Co., Wells, Nevada, recently purchased a new Caterpillar diesel D397 electric set (314 kw.), approximately doubling its capacity to handle a steadily increasing demand for power. Four Caterpillar diesel electric sets—the D397 and three D17000's—and a gasoline engine now produce power for the company in town, while approximately one third of the company's output comes from a hydro plant at Trout Creek, eight miles west of Wells in Starr Valley. According to H. H. Cazier, company president, the amount of electricity used in Wells has doubled in the past five years, and the company recently signed a contract to furnish power for Bell Telephone and Telegraph installations being made in television towers under construction in the vicinity. First trial runs of the new power setup were held early this year and were highly successful, insuring the community of enough capacity to meet its needs. Trout Creek is one of three or four water sources in the Ruby Mountains capable of producing enough power to keep a hydro-electric plant going the year round. But with this creek, as with other such streams, water is only plentiful two or three months in the year and is especially short rationed in the winter, when demand in Wells, Nevada is at its peak, hence the diesel emergency plant.

# M/V "FRANK W. BANTA"

By DOUGLAS SHEARING

**A**NOTHER outstanding contribution to the inland water transportation service is the M/V *Frank W. Banta* recently designed and built by Avondale Marine Ways, Inc., for the Plaquemine Towing Corporation of Plaquemine, Louisiana, which was christened and sponsored by Miss Janet Banta, attractive young daughter of Capt. J. W. Banta and Mrs. Banta. This is one of a number of tugs and towboats built by Avondale this year to meet the ever-increasing equipment demand of the river petroleum transportation service. The *Frank W. Banta* which will be skippered by Capt. Harry S. Banta, is a sleek, ultra-modern towboat of the following dimensions: length 99 feet, beam, molded 26 feet, draft 7 feet, and has a towing capacity of 8000 tons. The comparatively shallow draft makes the vessel particularly adaptable for use in the intracoastal waterways. Design and equipment are in accordance with American Bureau of Shipping standards. Access to all decks and quarters, including pilothouse, is by means of interior passage and stairways which is particularly desirable during inclement and cold weather. Exterior vertical steel ladders and inclined steps are also provided for convenience and safety. Ship to shore radio is installed for frequent communications with shore interests, and the now indispensable radar unit makes possible uninterrupted travel in heavy and even blind weather with absolute safety.

The vessel is of all-welded steel construction with heavy transverse frames and longitudinal girders designed and built to withstand very rugged service required of this type of boat. The usual longitudinal and transverse bulkheads forming the water and fuel tanks are of the conventional design and with adequate capacity for long range towing. Watertight and non-watertight bulkheads, diaphragm, etc., are built into the bow and stern. Hull plating is extra heavy and framing is closely spaced for necessary rigidity. Deck beams are of 4 in. x 3 in. x  $\frac{1}{8}$  in. inverted angles.

The *Frank W. Banta* is powered by two General Motors diesel engines, model 12567-A, each developing 900 hp. at 747 rpm., and is equipped with Falk airflex clutch and a reduction gear ratio of 2.48:1. Main propulsion engines can be controlled from pilothouse as well as manual controls in engine room. The two large propellers are of alloy steel, 3-blade, which measure 74 in. dia. x 66 in. pitch and of opposite rotation. Ample power is required for pushing up to 50,000 barrels of oil for long distances, frequently approximating 2000 miles and at times against swift moving currents. Adequate and surplus power is extremely important in this type of vessel for negotiating passage through locks and other close quarters, requiring a high degree of maneuverability and quick and effective response to controls.

An important maneuver is "walking" or "flanking," which is a lateral motion of vessel often necessary and accomplished by means of "flanking" rudders in conjunction with the conventional rudders and which supplement steering rudders for reverse motion control. Steering is through two large spur gear quadrants, made by Avondale, which have a 20 to 1, worm gear reduction ratio and powered by an Ingersoll-Rand air motor. This entire mechanism on the stern deck is covered by an aluminum check plate platform, which results in a clear deck and prevents the possibility of fouling. Additional outstanding features are: built in mechanical refrigerator, extra large boiler for ample heating and service, and 5-40,000 cfm. blowers (two for air supply and three for exhaust), which provide more than adequate ventilation throughout the vessel.

The vessel will operate between the Port of New Orleans area to such extensive points as Pittsburgh, Chicago and other mid-western and intermediate ports. Capt. J. W. Banta, President of the Plaquemine Towing Corporation, is very well and favorably known among the river fraternity, as are the other officers of the Company who comprise: Harry S. Banta, Vice President; John E. Jumonville, Secretary and Treasurer; F. W. Banta and George Wilso Banta, directors, all of whom have been engaged in the petroleum transportation trade for a number of years.



E

# Exchange Your Diesel Maintenance Ideas

CONDUCTED BY R. L. GREGORY

## Maintenance Costs of Large Heavy Duty Slow Speed Diesel Engines in Power Generation

*Foreword:* At the fall meeting of the Michigan Municipal Utilities Association, the following paper was presented by Mr. J. B. Sims, Supt. of the Board of Public Works at Grand Haven, Michigan. Mr. Sims has under his supervision one of the finest diesel plants in the Middle West, and has long been considered an authority on diesel plant operation. It is with his permission and our appreciation that we herewith present this paper, which the writer feels will be of interest to each and every one of our readers.

**W**HEN operating costs of electric power generation are discussed and various types of prime movers are considered, the first objection voiced to the use of diesel engines, particularly by those who have not taken the time to study the complete cost per kwh. delivered to the switchboard, will generally be "excessive maintenance costs." There is no doubt but that this maintenance problem constitutes an important factor in the total production cost, but hastily drawn conclusions should not be resorted to without factual information.

Since the inception of the internal combustion engine with its multiplicity of rotating and reciprocating parts, the resultant friction, vibration and wear problems, much effort has been expended and progress made in reducing maintenance. For example, witness the ultra-reliability and increased number of hours between overhaul of the modern aircraft engine as compared with the venerable Curtiss OX-5 of World War I period.

In striving for the utmost in performance and efficiency in generating plants, new stresses are often imposed upon the materials from which equipment is constructed as the higher temperatures and pressures are encountered. As a result new improved materials and processes are constantly being developed, and as these new materials prove their worth, the machine designer takes advantage of them to improve his product. He may again approach the limits of the capacity of the materials, but endeavors to maintain sufficient design safety factor. There is always a compromise between obtaining the ultimate in performance and yet retain sufficient design safety factor, thus affecting the amount of maintenance to which the equipment will be subjected.

The diesel engine is not alone when facing these maintenance problems which may be encountered

from a struggle for increased performance. The modern steam plant, with its increasing temperatures and pressures and its effort to burn a greater variety of fuels, has also experienced problems. For example, one could hardly compare the modern feed water treatment, which has become an exact science for high temperature, high pressure steam generators of today, with the methods practiced in the low pressure saturated steam plants a few years ago. This improvement in water treating was necessitated by difficulties encountered.

Those operators burning the more difficult coals of the country under modern steam boilers are well aware of the maintenance encountered. Stoker or mill repairs, slag and fly ash difficulties and many other problems are too numerous to enumerate. Likewise, when the diesel plant operator attempts to burn the heavier more viscous but cheaper residue fuel oils, his maintenance problems also become more pronounced.

*Principal Maintenance of a Diesel Plant Centered in the Engine Itself.* As a prime mover the large heavy duty diesel engine used in power generation is of a reasonably compact design, reflecting development over a period of many years. Obviously the principal maintenance is centered within the working parts of the engine itself, since its complement of auxiliaries is relatively simple as compared with a steam electric power generating plant of equal size and efficiency. The maintenance of the diesel engine as a prime mover could not equitably be compared with the steam turbine alone. The steam turbine must utilize a greater number of important auxiliaries including first, and most important from the maintenance standpoint, the boiler or steam generator with its feed water pumps, treating and heating system, fuel burning system and the many other important auxiliaries that must be considered.

In the past, when considering the relative costs of different fuel power generation using different types of prime movers the comparison has generally been made between steam and diesel plants. As the maintenance expense of the auxiliaries of a diesel plant was a relatively small item compared with the maintenance of the steam generating or boiler plant, the greater amount of maintenance of the diesel engine itself over the turbine was offset in considering the plant as a whole. Although it is a little early to predict, this comparison could be changed with the advent of the gas turbine

which is now being offered commercially in the 5,000 to 6,000 kw. sizes, and which is more or less self-contained with a much smaller complement of auxiliaries than the steam turbine. Thus the maintenance will, in effect, be confined principally to the turbine itself.

Perhaps much of the maintenance of the gas turbine electric generating unit will center in the turbine's combustor chambers and the blading. These and other vulnerable parts may, for example, experience maintenance which could conceivably be aggravated by the burning of high sulphur and carbon residue fuel oils. Although the 1500° temperatures of the modern gas turbine are not entirely out of the range of modern high temperature steam practice, the corrosiveness of the direct burned fuels might be more of a problem than the steam whose quality may be controlled by feed water treatment. Thus, when the gas turbine becomes more widely used, and the overall maintenance costs of the turbine unit with its closely associated smaller complement of auxiliaries are considered for comparative purposes, (gas) turbine maintenance vs. diesel maintenance may take on a more direct comparison between prime movers. The steam generating plant will not be in the picture.

The diesel engine generating plant is usually designed with a reasonable number of units to allow not only emergency repairs but a program of maintenance. Much of this maintenance will be of a preventative nature, and will eliminate possibilities of emergency shutdowns. The relative high efficiency of the diesel in the smaller sizes allows a plant to be constructed with a larger number of smaller units than the corresponding steam plant and yet show a comparable overall plant efficiency.

*Standardization of Maintenance Procedure.* There has been much effort expended toward standardizing maintenance programs and procedure in diesel engine plants. Many schedules have been prepared for maintenance crews which range from a comparatively simple procedure with practically no records kept, on up to the more elaborate ones considered by some to go to the extreme.

Someone has said that "it takes a heap of living to make a home." Parenthetically, "it takes a lot of living with a diesel engine" of a given manufacture, type and model to know just what parts require more frequent attention and to strike an

economic compromise on frequency of inspection and preventative maintenance. The manufacturer can be quite helpful in formulating general recommendations in this respect, based upon the experience of other users, but the final decisions must be made by the operator himself who learns by hard experience. Operating experience with a particular model may often not be available due to its being a new design. There is always the economic or cost factor to be considered by the operator, but most important is the fact that the load must be carried when needed and the availability factor good.

*Engine and Design and Operating Characteristics Vary.* For example, to make a general rule and require crankpin bolts in four cycle engines to be discarded upon the completion of a given number of hours of operation may be a desirable precautionary measure in some engines but an unnecessary expense in others. The author recalls that a number of large four cycle engines, operating many thousands of hours over a period of some 18 to 20 years, have not had a single bolt failure or crack occur. Repeated magnaflux and other tests fail to show any sign of possible failure. Samples of bolts cut up for pull tests show practically the same elongation and tensile strength as the specifications of the original material; whereas, on a two cycle engine of a later design and from a different manufacturer, two crankpin bolts were found to be broken. Fortunately they were discovered during an inspection period before any damage had been done.

Each engine type, therefore, has its own peculiarities of design which effect the operator's maintenance procedure. Perhaps it could be said from the experience with the bolts in the four cycle engines, that the bolts might be sufficiently over-designed to preclude any failure under normal conditions. Or perhaps it might be contended that they were not over-designed but designed with sufficient safety factor to last the life time of the engine. Nevertheless it is interesting to note that the engine manufacturer, apparently from a desire to prevent any possibility of failure, has in the past recommended changing of the bolts periodically.

In living with his equipment, the operator may often be able to suggest minor improvements in design to the manufacturer, and even make a few himself to existing equipment without being accused of trying to redesign the entire engine. The engine manufacturer may work closely with the operator, learn of the weak points on the equipment that develop during operation, and use the experience to improve his product.

*Examples of Minor Improvement Possibilities.* Many, no doubt, will be familiar with a well known reliable four cycle, 22-inch x 30-inch stroke, precombustion head type engine built in considerable numbers a few years ago, which had a split box type bearing on the piston pin end of the connecting rods, using poured babbitt or Parsons white bronze bearing surfaces. These bearings would ultimately pound out, the babbitt often cracking and causing considerable maintenance. Many of these have long since been machined out

and a one piece yellow bronze or Bronzoid bushing, with less clearance than formerly used on the babbitt bearing, keyed into the box. The reduction in maintenance caused by this change was outstanding.

More recently, the manufacturer has redesigned the piston rod, strengthening the eye section, and using a one piece bronze bushing. Possibly, due to the excessive clearance caused by the wear and cracking of the babbitt in the early design, and the resultant pounding, in a few instances cracks occurred in the eye section of the rod causing them to let go and wreck the engines.

This same type engine, when operating on heavy viscous fuel for which it is noted as being able to burn successfully, experienced excessive wear on valve stems and the thrust spool-shaped valve guides located at the top of the valve stems. This allowed the valve stem bushings to wear and the heads to wallow in the seats, and called for continuously refacing the valve heads and seats in the valve cages. The building up of the work valve, valve stems and the top guides with hard chrome, eliminated the major portion of this maintenance, as well as salvaged some valuable worn parts which might otherwise have been junked.

Hard chrome plating has also successfully been applied to wear areas on many parts of the large two cycle engines, including such applications as the relatively large needle valves on the fuel atomizers of air injection engines, air regulating valves, and the Bosch type pump plungers and the smaller needle valves of the spray nozzles on mechanical injection engines. Worn areas are first ground undersize, are then chrome plated and finally precision ground to size. Afterward, the plungers in the pumps and the needle valves are hand-lapped into the bodies.

These parts, when properly chrome plated and finished, give a much longer life than the original parts, particularly where difficult fuels are encountered. One 9½-inch piston pin which was built up by hard chrome has been operating in a larger four cycle engine for several years without any sign of wear. It should be stressed, however, that chrome plating is by no means a cure-all, and that it should be carefully applied with the plating being done by a competent plating firm on carefully prepared surfaces and under supervision of a competent mechanic.

Many other examples of improvements by the maintenance man could be cited. For example, a siege of cylinder liner breakage on four cycle engines a few years ago resulted in requesting the manufacturer of these liners to increase the fillet in the vicinity of the machined supporting flange area. Obviously, it was necessary to grind out the cylinder block slightly to allow for this increase in fillet thickness.

From an examination of the design of the block and a study of the water circulation, it was apparent that air might be trapped in the highest area around the top of the liner and retard the circulation of the cooling water. The drilling of some holes in the webbing improved the circula-

tion without weakening the casting. This improvement in water circulation, together with the elimination of a sharp point on the liner where the cracks seemed to start, reduced the liner breakage materially.

These examples of the operator and the engine manufacturer effecting improvements during years of usage are given simply to illustrate the possibilities of improvements that may be made to mutual advantage. With the continued thought being given to improvements to the internal combustion engine by engine manufacturers, lubricating oil refiners, oil filter designers, as well as the operators themselves, there is reason to hope for results that will help offset the terrific increase in cost of replacement parts and labor, experienced during the past few years.

*Maintenance in Combustion Area.* The greater portion of the maintenance costs of large, slow speed diesel engines probably involves ring and liner wear with the occasional cracking of a cylinder or piston head and possibly a liner. A number of factors or combinations of conditions may have a bearing upon these maintenance problems. Excessive ring and liner wear may be caused by:

- (a) Type of engine and design.
- (b) Lubrication.
- (c) Operating temperatures.
- (d) Incomplete combustion.
- (e) Quality of fuel (presence of abrasives, chemical composition, etc.)
- (f) Quality of material in cylinder liners, piston rings, etc.
- (g) Air filtration, and many others.

The detailed discussion of these factors and the combination of them are beyond the scope of this paper.

Probably next in importance to the design of the engine, and the type of fuel used, is the cooling system. Cast iron rings, piston and cylinder heads and liners occasionally crack and much of this may be traced to improper cooling. Perhaps it might be said that cast iron does not crack directly from heat but from improper cooling or heat dissipation following heating. For example, after preheating cast iron for welding, great care must be taken in cooling, to prevent it from cracking. Stresses are apparently set up that are not easily relieved.

Sometime ago the author experienced a siege of liner breakage on large two cycle engines which was difficult to explain. It was noticed that the breakage was usually discovered shortly after starting the unit early in the morning following an overnight shut down, which led to the conclusion that the cracking might be occurring due to rapid cooling during the shutting down of the unit. It should be noted that in taking the unit off the line, the load was gradually reduced for a reasonable period prior to actually stopping the engine. The raw cooling water, taken from the lake, is cold in this location during most of the year, and orders were given to stop the flow of cooling water to the heat exchangers as soon as the engine was stopped, operating only the soft water (jacket water) pumps and the auxiliary oil pumps to dissipate the accumulated heat more slowly. This resulted in an  
... and now please turn to page 66 ...



## WHAT'S GOING ON IN ENGLAND

CONDUCTED BY HAMISH FERGUSON

Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.

### THE BRITISH ADMIRALTY STANDARD RANGE I ENGINE

**Details of a New Type of Diesel Engine Which Is Exceptionally Compact and Gives More Power for a Given Weight Than Previous Designs**

**I**N 1945 the need became apparent for a range of diesel engines for propulsion and auxiliary purposes in the British Royal Navy with a power/weight ratio higher than that available currently from commercial sources. The requirements were such that the design was to be suitable for use with varying numbers of cylinders and to cover a power range of 750-2,000 bhp.

Detailed design was undertaken by the Engineering Department of H.M. Dockyard, Chatham, in conjunction with the Admiralty Engineering Laboratory, West Drayton, and the manufacture of a prototype 16-cylinder version was commenced at Chatham at the end of 1948. This work involved the development of many techniques new to current Dockyard practice but, through the skill and long experience of all tradesmen concerned, fitters, boilermakers, copper-smiths, foundrymen and pattern-makers, all difficulties were soon overcome, and trials were started in 1949.

The engine so developed was called the Admiralty Standard Range I (A.S.R.I) engine, and designs have now been completed for the 16 and 12 cylinder "V" and the 8 and 6 cylinder "in line" versions in both supercharged and unsupercharged forms. Numbers of these engines are now being produced at Chatham Dockyard and various well known firms for general application in the Navy.

The general particulars of A.S.R. I engines are shown in table I. The design incorporates: (a) direct injection, 4 valve cylinder heads; (b) all welded steel frame; (c) chromium plated cylinder liners; (d) copper-lead main and large end pre-finished thin shell bearings, the latter being of fork and blade type; (e) engine driven and engine mounted lubricating oil scavenge and pressure

TABLE I

	16 V.T.S.	12 V.T.S.	8 L.T.S.	6 L.T.S.
Bore.....		9 $\frac{3}{4}$ "		
Stroke.....		10 $\frac{1}{2}$ "		
Maximum rpm.....		1,000		
Maximum bhp., Supercharged.....	2,000	1,500	1,000	750
Maximum bhp., Unsupercharged.....	1,400	1,050	700	525
Dry weight (lb) including engine mounted auxiliaries.....	36,000	29,000	24,000	19,000
Length.....	16'10"	14'0"	16'6"	14'0"
Breadth.....	5'4"	5'4"	4'3"	4'3"
Height.....	8'7 $\frac{1}{2}$ "	8'6"	8'7"	8'6"

pumps and sea and fresh water cooling pumps; (f) hydraulic governors on both propulsion and generator engines.

Particular attention has been paid to complete

interchangeability of all replaceable parts, including identical crankshafts and bedplates for "in line" and "V" versions of equivalent number of crank throws, and to accessibility and ease of maintenance.

#### Steel Rationing

The steel pinch in England is likely to force serious cut-backs in production. Consumer industries have already been hard hit with one of the largest automobile manufacturers taking a 25 percent cut in steel supplies. Machinery and vehicles for the consumer market will generally be cut 16 percent of the preceding twelve months beginning April 1st.

Defense production will receive as much of the dwindling steel it needs to do the job required of it.

The slump in steel production is due mainly to a serious shortage of scrap. In order to conserve the dwindling supplies, rationing has been instituted.

This lag in steel production comes at a time when rising defense needs demand more of the metal. In order to overcome the scrap shortage, an attempt is being made to increase the supplies of pig iron, the other chief ingredient in steel. This, however, also presents a major problem since Britain normally imports about half of the iron ore it needs to produce pig iron.

Negotiations are presently underway for steel purchases from abroad with the likelihood that increased imports will be brought into the country. This, it is expected will not ease the shortage before the middle of the year. In the meantime, essential industry will be the least affected by the rationing program.

# LIGHTSHIP "LURCHER"



**O**NE way to test a ship and its engines is to send it 19 miles out to sea, anchor it in the midst of treacherous shoals, and keep it there, tossing and pitching, for three months. That's the test passed four times each year by the lightship *Lurcher* No. 2. The *Lurcher* stands guard in the Bay of Fundy, off Yarmouth, Nova Scotia for 90 days at a stretch, marking the spot of the dangerous Lurcher Shoals and guiding other vessels safely through. At the end of her 90 day stretch the *Lurcher* returns to port, but only long enough to pick up supplies before moving out to her post.

The *Lurcher* is believed to be the first vessel ever made in Canada for its particular duties. Other lightships have been converted from other services for this purpose. The 617-ton craft was built by Canadian Vickers of Montreal and is driven by a 4-cycle Atlas Diesel engine, a product of the National Supply Company. The engine, located in the aft engine room, has 6 cylinders, 13" diameter x 16" stroke, developing 550 bhp. at 300 rpm. In addition to carrying the vessel to and from port, the engine is used to maintain the ship's position, especially during rough weather.

The *Lurcher* is of all-welded steel construction. Her dimensions are: Overall length 128'0"; Length on load water line 112'0"; Beam molded at second deck 30'6"; Depth, molded main deck at side amidships 21'4½". She has a continuous sheer line, a curved stem and overhanging stern. The superstructure on her upper decks houses the ventilation equipment. The wheelhouse is at the forward end. The second deck contains accommodations for both officers and crew, as well as

a compartment for the windlass and the bosun's store. Mess areas do double duty as recreation rooms. Ventilation is mechanical and gives the necessary air changes to ensure comfort throughout the ship for her 16-man crew. Heating is steam convactor type.

Once the *Lurcher* reaches her station, the crew can perform their normal duties without exposing themselves to the rigors of Bay of Fundy weather. Living areas are positioned below the upper deck, with the wheelhouse immediately above. Free access is available from all living and working areas without going on deck. The ship is well divided with watertight bulkheads and her hull has been stiffened to stand up under navigation in icy waters. The vessel is rigged fore and aft with two steel masts equal in height. The foremast is known as the lantern mast, and has an open aluminum grating gallery 6'0" in diameter near the top for servicing the light. The radio beacon antenna is carried on aluminum triatic supports attached to each mast. The main mast is rigged with a double spanker sail to help steady the ship in rough weather. Warning devices consist of a 1,000 lb. fog bell mounted on a steel belfry fitted on the upper deck, and an "Ardente" loud-hailing installation with mechanical directing apparatus for hailing other ships. The vessel also carries a radio direction finder, wind direction indicator, wireless telegraphy equipment and radio telephone. A steel turtle deck covers the fore end of the upper deck for shelter for the crew. Two life-boats, one of them motor-driven, are carried in crescent mechanical davits with power-operated hoisting arrangements.

Lighting power and fog signal units are housed in the machinery spaces. For auxiliary power and lighting, three Vivian Diesels are direct-coupled to English Electric 60 kw. three-phase, 250 volt generators. Each of these engines develops 100 bhp. at 600 rpm. and is capable of a maximum of 125 bhp. Auxiliary machinery includes 2 Ingersoll-Rand two-stage, air-cooled, electrically-driven air compressors of 5.75 cfm. at 110 psi; two fire pumps; and diesel oil transfer pump; one evaporator feed pump; one condensate pump; one sanitary pump; two fresh water pumps; and an evaporator with a capacity of 759 gallons per day. Steam for heating, tank cleaning, de-icing, and evaporator operation is provided by a horizontal oil-fired Watts boiler. In order that engineers may make minor repairs while the vessel remains on station, a lathe, drill press and motor-driven bench grinder are located in the forward engine room.

Because the vessel is continuously anchored, windlass and anchor cables are much stronger and more powerful than classification. The windlass is driven by a splashproof, squirrel-cage, two-speed reversible 40 hp. induction motor operating on 220-volt, 3-phase, 60-cycle current. The windlass has a capacity for lifting vertically 180 fathoms of 1-¾" diameter stud link cable plus the 7,000 lb. anchor, which is stowed in the center hawse pipe. The windlass machinery is situated on the second deck and is of the double vertical wildcat type with capstan bears mounted above the wildcats. The *Lurcher* and her machinery were built under survey to Lloyd's Register highest class to the requirements of the Canadian Board of Steamship Inspection and designed by the Dept. of Transport.

## SERVICING AEROQUIP INDUSTRIAL SELF-SEALING SERIES 5100 COUPLING

**T**HE Aeroquip 5100 Series Self-Sealing Coupling was designed and developed to facilitate service and maintenance of modern industrial equipment. The Coupling makes it possible to separate lines without a loss of fluid and to reconnect the same fluid-filled lines without the introduction of air into the system. Thus, systems with this coupling need no draining before disconnection, or priming after reconnection. The 5100 Series Self-Sealing Coupling is used with air, water, hydraulic fluids, hot engine oils, crude and fuel oils, Diesel fuels, gasoline, freon and many other fluids. The Self-Sealing Coupling is composed of two coupling half assemblies, which when coupled are held together by a union nut (wing or hex type). Connection or disconnection can be accomplished easy by hand operation.

When uncoupled: The half shown on the left (figure 1) contains a spring loaded poppet valve (1). The poppet valve has a synthetic rubber face which is held firmly against its seat by spring pressure. The half shown on the right contains a spring loaded annular sleeve (3) which slides on a tubular valve (5) that is fixed in the body. The sleeve holds a replaceable synthetic sealing washer (2) firmly against the under-face of the tubular valve head. An "O" ring packing (4) provides a seal between the sleeve (3) and the body.

When coupled: (See figure 2). As the two halves are positioned for coupling the tubular valve head makes contact with the poppet valve. Simultaneously the recessed face of the left hand body makes contact with the face of the synthetic sealing washer (2), thus expelling all air and providing the initial seal between the two coupling half assemblies. Tightening the union nut draws the halves together, moving the poppet valve and the annular valve sleeve, to open the fluid passage (6). When fully coupled, the synthetic seal is compressed between the two halves to form a mechanical seal.

The Self-Sealing Coupling can be installed by mounting it on a bulkhead or bracket with a detachable flange. It can also be attached directly to a piece of threaded pipe or flexible hose with male pipe thread ends. When installing the coupling, one half should be connected to a hose line. This is necessary to allow for the change in length of the coupling during connection and disconnection. The coupling should be located to allow free access to the union nut. If the fluid system is subjected to high pressures when the coupling is disconnected, the coupling half with the poppet valve should be installed on the pressure side. If thread sealing compound is used, apply only on the connecting male pipe threads. This is to prevent the sealing compound from causing malfunction of the coupling valves. When two couplings of the same size are mounted near each other (see figure 3) the coupling halves can be mounted in reverse to prevent the possibility of mismatching lines.

If the coupling is disconnected in dirt or paint-laden air, the two coupling halves should be capped



The Aeroquip 5100 Series self-sealing coupling.

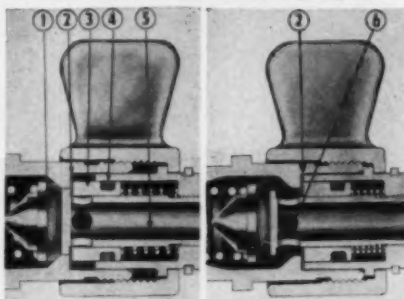


Fig. 1. Coupling partially disconnected.

Fig. 2. Coupling completely disconnected.

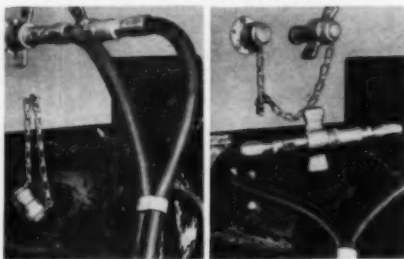


Fig. 3. Typical installation. Note couplings reversed to prevent mismatching.

Fig. 4. Note how all halves are capped with a minimum of parts.

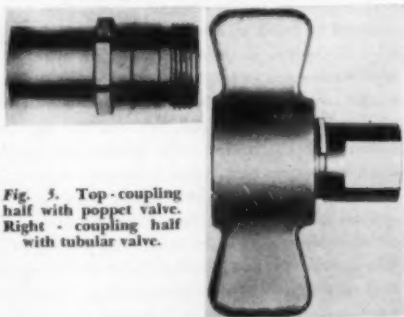


Fig. 5. Top - coupling half with poppet valve. Right - coupling half with tubular valve.

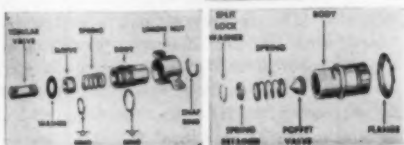


Fig. 6. Left—Exploded view of coupling half with poppet valve. Right—Exploded view of coupling half with tubular valve.

(see figure 4). Figure 4 is a suggested method for capping four coupling valves with a minimum number of parts. Valve faces of the coupling halves are smooth and permit easy cleaning. It is recommended that valve faces be wiped thoroughly each time the coupling is to be connected. This will prevent any leakage which might occur as a result of dirt or grime on the sealing surfaces.

Not all coupling halves with poppet valves can be disassembled. If sizes  $\frac{1}{8}$ -inch to  $\frac{3}{4}$ -inch (pipe thread) inclusive cannot be serviced without disassembly they must be replaced with new assemblies. Size one inch and larger can be disassembled. If leakage occurs at the valve seat, temporarily reconnect to the mating half to realign the poppet valve and dislodge foreign particles from the valve seat.

If leakage continues when disconnected, relieve the pressure in the system. Remove the coupling half and place it on a bench with the pipe thread end down. Use the eraser end of a lead pencil (see figure 7) and push down on the face of the poppet valve. This will expose the seat of the poppet valve. Inspect the valve seat for damage or foreign particles. Remove foreign particles with a stiff bristle brush dipped in carbon tetrachloride. This process should be repeated around the entire circumference of the poppet valve. Reseat the poppet valve, install the coupling half, apply pressure and check for leakage.

If leakage persists, disassemble the coupling half as follows: Position the coupling half on a bench with pipe thread end up (see figure 8). Insert an extractor tool, part No. F-1497 in the spring retainer ring (see figure 6). Press tool down. You may employ a vise, drill press, arbor press or hand pressure. A split lock washer holds the spring retainer and spring in position. While the spring is compressed, remove the split lock washer with a small wire hook. Release tension on the tool and spring retainer. The spring and poppet valve can now be removed. Inspect the synthetic seal on the poppet valve. If damaged, replace with a new poppet valve. Inspect the seat in the body. If damaged replace with a new body.

To reassemble be sure the pointed end of the poppet valve is toward the pipe thread end of the coupling body (see figure 6). The spring retainer should rest on the spring so the tapered side faces the pipe thread end of the coupling body. Insert the tool in the spring retainer and drop split ring halves in the opening between the pipe thread and tool. Press tool down until split ring halves are aligned with the body recess below the pipe threads. Use a small wire hook to position the split lock washer in the recess. Remove tool. If leakage occurs at the valve seat, on coupling half with tubular valve, when disconnected, clean the tubular valve face with a cloth and carbon tetrachloride (see figure 9). Then temporarily reconnect to the

mating half to dislodge foreign particles from the valve seat. If leakage continues when disconnected, inspect the synthetic seal for damage. If damaged, the seal must be replaced. If leakage occurs around the sleeve circumference when disconnected the coupling should be disassembled to inspect the



Fig. 7. Cleaning the poppet valve. Fig. 8. Removal of spring retaining ring lock washer.

"O" ring for damage. If the head of tubular valve has been damaged, the tubular valve should be replaced.

To replace any of the above parts, disassemble the coupling half as follows: Remove the snap ring (see figure 6) with a small screw driver and slide off the union nut. Place the coupling body in vise jaws. Place the valve extractor tool No. 1550-size on the head of the tubular valve (see figure 10). Unscrew the tubular valve from the body. Caution must be exercised as the valve seat on the tubular valve head can be distorted. The tubular valve is under spring tension. Use care when the tubular valve is unscrewed from the body to prevent losing



Fig. 9. Cleaning the face of the tubular valve.

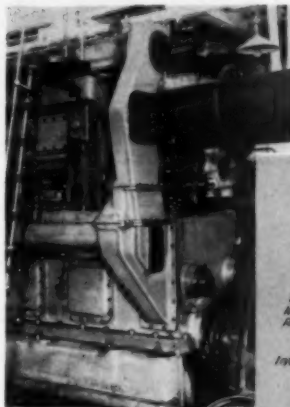
parts. Remove tubular valve, sealing washer, sleeve and spring from the body. Visually inspect the synthetic sealing washer for damage. Inspect the "O" ring packings for cuts or nicks. Replace all damaged parts.

To reassemble lubricate all parts with a light oil. Drop the sealing washer over the tubular valve (see figure 6). Place the sleeve with "O" ring on the tubular valve. Be sure the "O" ring end of the sleeve is toward the threaded end of the tubular valve. Slide spring on behind sleeve. Then tighten the tubular valve assembly into the coupling body with the valve extractor tool until snug. Slide the union nut on to the pipe thread end of the body and secure with the snap ring.



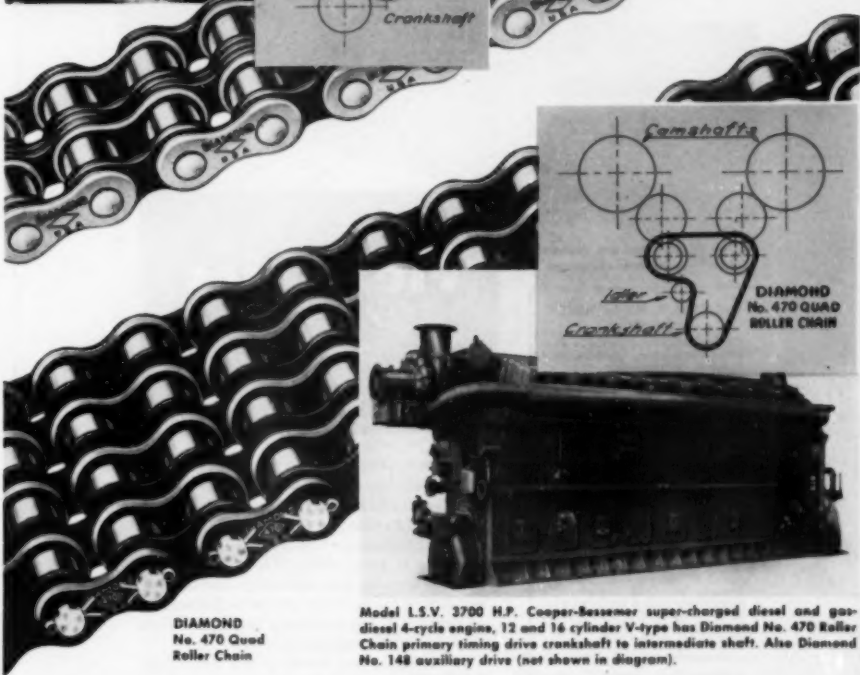
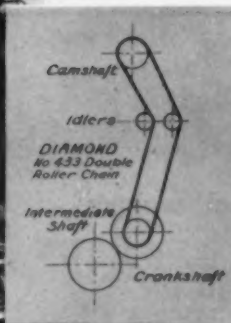
Fig. 10. Removal of the tubular valve with extractor tool No. 1550.

# IMPROVED DRIVES for DUAL-FUEL ENGINES



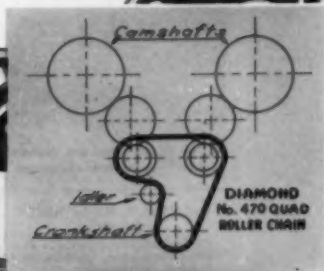
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## GM Franchise Extended

Stewart & Stevenson Services, distributors for General Motors diesel engines, has been given an extension of their GM distributor franchise to include the Lubbock area, Joe Manning, vice-president and general manager announced recently. New engines as well as parts and service are now available through the Lubbock branch. Fred Malley is manager of Stewart & Stevenson's Lubbock branch. Chris Pratas is in charge of parts.

"The same Stewart & Stevenson service on GM Diesel engines which has become famous and recognized in other parts of Texas will be available through the Lubbock store," Manning continued.

"It is our aim in serving the Lubbock area to put the full facilities of our organization behind this operation in order to bring to power users in this area the many tried and proven service principles which have made it possible for Stewart & Stevenson Services to reach top rank in the diesel field," Mr. Manning continued. Among the "firsts" which Stewart & Stevenson Services has introduced in Texas are: an engine assembly exchange plan at a fixed price for the customer; flat rate zone trip charges for service instead of a mileage rate which has contributed to lowering maintenance costs for owners of General Motors diesel engines, and a Stewart & Stevenson Service School for the operators of GM diesel engines. In addition, Stewart & Stevenson Services maintains a large distributor

stock of General Motors engine parts, with quantities on hand at all times to completely build practically any GM diesel sold.

At the Houston headquarters and manufacturing plant, Stewart & Stevenson Services has established a service school for the customers. A new course in diesel engine maintenance and operation is started every two weeks and is open to personnel of any company which operates GM diesel engines. The course offers a practical approach in the care, operation and maintenance of GM diesel engines. This Stewart & Stevenson Service school has been widely recognized and has been attended by maintenance personnel from Mexico, Great Britain, Arabia, Venezuela, and many other foreign countries. Special classes are held for Spanish-speaking people. The Stewart & Stevenson Lubbock branch is located at 1614 Fourth St. Telephone 2-7538.

In addition to General Motors diesel engines, Stewart & Stevenson Services also manufactures a complete line of oilfield rig lighting equipment, utility units, pumping units, electrical generator sets, truck bodies and acts as distributor for Continental Red Seal engines, Chrysler industrial and marine engines, Chicago Pneumatic engines, Peter diesel engines and Gardner-Denver pumps.

## Equipment Display for AED



International Harvester Company welcomed AED conventioners in January and extended a cordial invitation to distributors to visit the International Harvester general office showroom at the corner of Michigan avenue and Lake street. In honor of the Associated Equipment Distributor's Convention in Chicago during January, the modern showroom featured an industrial equipment display.



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## Veteran Receives Award



Alvin F. Welsh

Alvin F. Welsh, veteran of 25 years of service with Worthington Pump and Machinery Corporation, Harrison, N. J., has received a sapphire-studded service pin from A. H. Borchardt, vice president in charge of the sale of Worthington pumps. The presentation was made in

an informal ceremony in the reciprocating pump sales department, of which Mr. Welsh is manager. After attending St. Mary's College, St. Mary's,

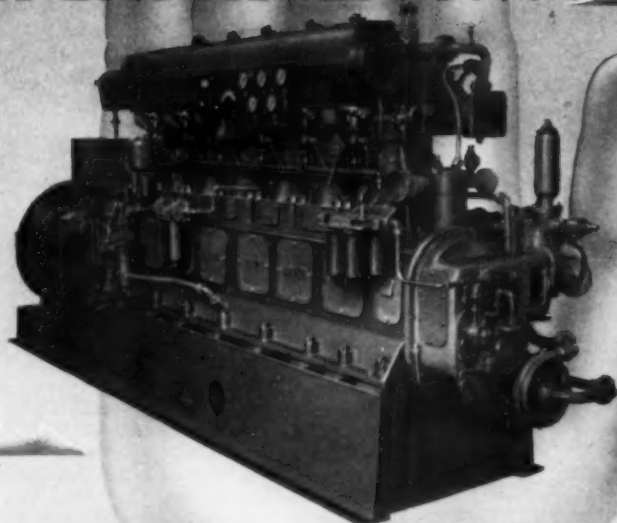
Kansas, Mr. Welsh started as an estimator at Worthington's Tulsa office in 1925. In 1930 he became an estimator in the Los Angeles office and in 1931 moved to the Kansas City office, becoming a sales engineer there in 1937. In 1942 he was transferred to the Reciprocating Pump Division in Harrison, N. J., of which he was made manager in 1948. He is a member of the American Petroleum Institute and a former member of the Engineers' Club of Kansas City, Mo.

## Names District Sales Manager

W. S. Andrews has been appointed New York district sales manager for Rockwell Manufacturing Company. Due to the reorganization of the com-

pany's sales structure into five regional areas, Mr. Andrews will succeed Mr. Harper, recently promoted to coordinate sales for the Boston, New York and Philadelphia territories. Mr. Andrews received a B.S. degree in Business Administration from the University of Pittsburgh. Upon graduation he joined the Nordstrom Valve Company as a salesman, covering Western Pennsylvania and Eastern Ohio. He was later affiliated with the Beaver Pipe Tools, Inc., of Warren, Ohio as Midwest District Manager. In 1938, Mr. Andrews returned to the Nordstrom Valve Company as a sales engineer with headquarters in Cleveland. He had been Pittsburgh district sales manager for seven years prior to his recent promotion. Mr. Andrews is a member of the Engineers' Society of Western Pennsylvania, the Sales Executive Club and the American Water Works Association.

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## Third of Its Class



The tug *Shamokin*, third of its class to be added to the Reading Railroad's marine fleet, was launched late last year at Camden, N. J., and is expected to join the *Tamaqua* and the *Pottsville* in service before March 1st. The three vessels, built at a cost of more than \$1,000,000 are said to be the most modern and powerful of their class in the country. The *Shamokin* is 110 ft. long, with 25 ft. 6 in. beam and 13 ft. depth, and is powered by a 1600 hp. Fairbanks-Morse opposed-piston diesel, identical to the engines used in submarines of the U. S. Navy.

Designed by Thomas D. Bowes, prominent naval architect, and built by the RTC Shipbuilding Company at Camden, the *Shamokin* incorporates many interesting design features. The tug will operate in New York Harbor, principally towing coal barges from Port Reading, N. J. to various points in the metropolitan area; but the vessel also is equipped with fire pumps, monitor and hose hydrants so that it may operate as a fire boat. The *Tamaqua* was the first of the three tugs to go into service and a complete description and an initial operating report are being prepared for release in the near future.



DIESEL PROGRESS

## Indianapolis Entry



Cummins workers see race car, following its arrival from the west coast. N. M. Reinert, immediate foreground and left, manager, Cummins Research Laboratory, and Freddie Agabashian, Albany, California, right, who will pilot the race car at Indianapolis, give the sleek speedster the "once over."

Another diesel race car has been built by Cummins Engine Company, Inc., of Columbus, Indiana, for experimental engine testing purposes. Company officials are planning to have this new and radically different design race car ready for the time trials and are confident of qualifying the Cummins entry among the 33 starters of the 1952 Indianapolis Speedway 500-mile classic.

Freddie Agabashian of Albany, California, one of the West Coast's leading drivers, is scheduled to pilot the Cummins entry. This wiry, slender, 138-pound, 5 feet 9 inch, 38 year old veteran racing driver first appeared at Indianapolis in 1947, capturing ninth place. In 1950 Agabashian qualified for a starting position with the third fastest speed of 132.792 miles per hour. His 1951 qualifying speed was 135.029 miles per hour, the sixth fastest. He completed 109 laps of the 1951 race at an average speed of 123.449 miles per hour before mechanical trouble forced him out of competition.

Kurtis-Kraft, internationally-known custom race car builders, fabricated the Cummins designed Indianapolis entry. Finishing touches were made at their Los Angeles plant and the race car was shipped via air freight to Columbus, Indiana. Maximum height of the race car is reported as 29 inches at the cowl as compared to the 41 inch over-all height of the 1950 Cummins entry. The power plant for the 1952 entry will be a newly designed horizontal, lightweight, highspeed experimental diesel engine of the following specifications, 4 1/4-inch bore, 5-inch stroke, and a piston displacement of 401 cubic inches.

Cummins engineers believe that the use of the horizontal type engine permits the design of a race car with a much lower center of gravity than any previous entry in the Indianapolis "500" and will allow the shifting of the entire drive line weight off-center to the inside of the car and track. Although the dimensions parallel those of the engine used in Cummins diesel special No. 61, which made racing history in 1950, Cummins engineers expect after two years of additional development work to turn the experimental diesel engine to be used in the 1952 race car in excess of 4,000 rpm.

Extreme care has been used in streamlining the

Cummins entry. Many details were worked out through exhaustive, full scale tests conducted at the University of Wichita wind tunnel at Wichita, Kansas. Cummins Diesel Special No. 61, which qualified at 129.208 miles per hour and then went 52 laps in the 1950 race was the first competitive diesel entry in "500" history. There were also Cummins diesel cars for experimental engine testing purposes in the 1931 and 1934 Indianapolis races on a non-competitive basis.

## Operating Records Shattered With Diesels

In a year-end statement by W. C. Baker, operations vice president of Baltimore & Ohio Railroad,

this 125-year-old railroad shattered all previous operating records. Attributing the results to increasing use of diesels—during 1951 its diesel fleet increased to 596 units—Mr. Baker said the "gross freight trainload" for 1951 was 2943 tons, up from 2695 tons in 1950, or an improvement of 248 tons or in excess of 9%. Net pay load average per freight trains rose 155 tons to 1474 tons in 1951.

Gross ton-miles per hour of crew time, a new, comprehensive yardstick in rail freight hauling, rose 3,000 tons to 32,643 ton-miles, or 11%. By the end of 1952 the B. & O. alone will have 695 diesel units in operation, plus nearly 250 additional units on its big subsidiaries, the B. & O. Chicago Terminal Railroad and Staten Island Rapid Transit.



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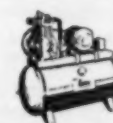
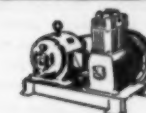
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## Maintenance

... continued from page 57 ...

immediate reduction in liner cracking. It was afterwards agreed that one does not make any special effort to cool an automobile engine after normal usage, but allows it to cool by natural radiation, unless by chance it happens to be severely overheated, whereupon care is exercised not to pour too much cooling water into the system which might result in cast iron cracking.

On occasion air leaks have developed in the air coolers of air injection engines which utilize the jacket cooling water for cooling the injection air. Since this leakage air circulated in the jacket water, it ultimately found its way to the highest point in

the cooling system of the engine, forming air pockets in the water circulating system around the top of the liner and in the cylinder heads. This results in erratic circulation and cooling in a rather critical area. Under these conditions liners and cylinder heads occasionally crack. It would seem therefore that a stable and continuous heat transfer rate, with the heat being dissipated as evenly and slowly as is practical, would be desirable in cooling cast iron, if cracking is to be discouraged.

Cooling plays an important part in the combustion conditions in the cylinder. The circulating water around the liner is required to absorb the heat not only from the combustion, but from the friction caused by the rings rubbing against the walls as

well. Ring-wall friction may be quite a factor, particularly in the two cycle engine, where it is often difficult to maintain an oil film between the rings and the cylinder wall. This might be illustrated by the failure of a piston trunk which had been operated with insufficient lubricating oil film between the 11/16-inch rings tried in lieu of the original 1/2-inch rings in an effort to reduce ring breakage. Other operators have used increased ring width in this same engine design, but the losing of the first piston trunk out of 24 pistons having thousand of hours of operation with standard rings tended to discourage further experimentation with wider rings. More consideration was given to lubrication and other factors which might contribute to these ring failures. Standard 1/2-inch rings with excessive tension have resulted in increasing ring and liner wear. Conversely rings with insufficient tension have a tendency to collapse. Moderate tension rings of a high grade material give the best results.

*Writer's Comment:* Having gone through all the various stages of experimentation with wider rings, rings of greater radial thickness than 1/2-inch standard rings with excessive as well as insufficient tension, the writer can fully attest to Mr. Sims experience and statement that the best ring for all around service is a moderate tension ring of high quality material, properly relieved as to fit in the grooves, with champhored edges on the down side of the ring.

The next issue will continue with this paper and a further discussion of varying problems and cost comparisons will be given.

## Adds to Shreveport Staff



T. M. Lamberth, Jr.

Appointment of T. M. Lamberth, Jr., to its Shreveport, Louisiana, office has been announced by Stanley E. Johnson, vice president of The Cooper-Bessemer Corporation, Mount Vernon, Ohio. The assignment as sales and engineering representative will be under the direction of A. K.

DeFrance, branch manager of Cooper-Bessemer's office and warehouse facilities in Shreveport. A mechanical engineering graduate from Texas A. & M., Mr. Lamberth has been associated with this engine and compressor builder at its engineering and manufacturing plant in Mount Vernon, Ohio. Prior to this service, he was a sales engineer with Joseph A. Coy Company and Arrow Industrial Manufacturing Company, both manufacturers of heat transfer equipment. Mr. Lamberth's activities will be devoted principally to the engineering application of gas, gas-diesel and diesel engines, as well as compressors and pumps widely used in the transmission of gas and oil in petroleum and chemical processing.

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... because they keep the lube oil clean—physically and chemically

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The "GRACE MORAN," other Moran tugs and many other vessels, power plants, railroads and transport lines have proved over the years that Briggs Oil Clarifiers improve engine performance by keeping lube oil clean.

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**BRIGGS CLARIFIER—MODEL CD**  
(Filter, Strainers and Oil Storage Tank—in one unit)

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for diesel engine maintenance

No. 233 Powerench - with torque indicator for Electro-Motive main bearing cap nuts... brings out in the aisle... applies 5 to 1 power ratio... saves up to 80% main bearing maintenance time.

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Ways

FREEDOM FROM WORRY AND TROUBLE  
PROTECTION OF EXPENSIVE EQUIPMENT  
POSITIVE PROFITABLE INCREASE IN OUTPUT

Unless you are using Safety Seal Rings you are probably getting less than the best performance from your equipment. It will pay you to write TODAY for Catalog DP-3, and name of nearest Safety Seal Representative.

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Regardless of Altitude or Engineering Problems...

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**Quality COOLING TOWERS**  
Meet Exacting Specifications

Tough cooling jobs are easily and efficiently handled by Pritchard Quality Cooling Towers. Take this Mexico City installation.

Jacket water from 6 heavy-duty diesels gets a cool-down from 110° to 90° F. at the rate of 12,960 GPM...and at more than 7,000 feet above sea level! Like every Pritchard Quality Cooling Tower, this unit was built and guaranteed to deliver rated performance with output to spare in emergencies. Why don't you, too, find out about the advantages of using Pritchard Quality Cooling

Towers to handle your water cooling problems? Consult your nearby Pritchard representative for full information.

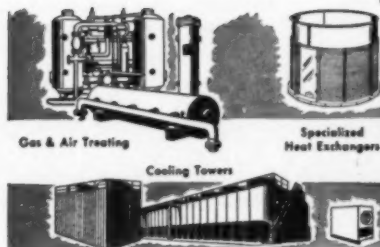
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## Assistant Parts Manager



Elwood F. Trantina

Elwood F. Trantina has been named assistant Western division parts manager for Caterpillar Tractor Co. with headquarters in Spokane, Washington, it is announced by J. E. Ferguson, Western parts manager. Born and educated in Illinois, Mr. Trantina joined Caterpillar in 1941 as an employee of the parts department order division. He served for over three years in World War II and at the time of his

discharge was flying instructor in the Southwest Training Command. After rejoining Caterpillar he was associated with the eastern, central, and western divisions of the parts department in several capacities until his recent promotion as assistant parts manager covering Caterpillar dealers in Washington, Oregon, Idaho, Montana, British Columbia, and Alaska.

## Expands Industrial Services

In a move designed to expand and increase the scope of its services to general industrial plants, the oil industry, railroads, municipal power plants, and the chemical industry, the west coast plant of Thompson Products, Inc., Bell, California has

announced formation of its Industrial Products Division, with branch headquarters in Dallas, Texas. This new division of the firm replaces the former Mid-Continent Division, and will act as the Dallas Branch of the west coast plant. All Thompson engine parts and products for large gas and diesel engines—valves, seats, guides, piston rings, compressor valves and valve seat grinders—used for replacement in the field, will be available through the Industrial Products Division.

In line with this broader industrial coverage, personnel changes have also been announced. James D. Creek, formerly Mid-Continent Division manager, has been named manager of the new Industrial Products Division, and will be in charge of the wider activities of this new department. A. S. King, formerly field engineer in the Mid-Continent for Thompson, has been advanced to district manager, Industrial Products Division, with headquarters at Dallas, Texas. Two new field engineers have also been added. Elton T. Blanton will work out of Houston in that capacity. He was formerly with Humble Oil and Refining Company. John T. Ross will act as field engineer from Lubbock, Texas, serving the industrial field in that area. Ross was formerly with Coastal Transport Company. All changes in the broadening of its services to industry through the new Industrial Products Division are effective immediately.



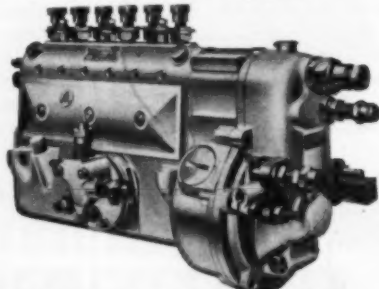
## Confidence Abroad



*Transport operators all over the world have learnt to trust this sign.*

In any language the letters on the C.A.V. sign stand for first-rate service facilities, maintained by highly-trained craftsmen, using special precision equipment.

Wherever vehicles fitted with C.A.V. Fuel Injection Equipment are exported—whether to Trondheim, Santiago, Hong-Kong or Sydney—there's a service agent or depot to give it the specialist attention needed for such high-precision equipment.



**Fuel Injection and Electrical Equipment**

*Service Depots throughout the World*

C.A.V. DIVISION OF LUCAS ELECTRICAL SERVICES INC., NEW YORK 19, N. Y.

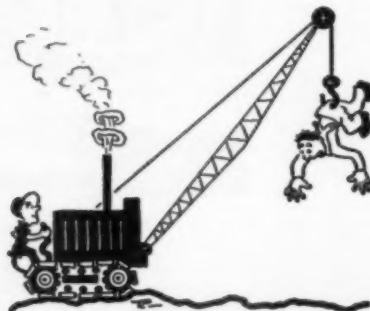
Sales Office:

14820 DETROIT AVENUE, CLEVELAND 7, OHIO

## Planing the Land for Irrigation



Two International TD-18A diesel crawlers pull 12-cubic-yard scrapers as they level a 40-acre field located 12 miles northwest of Center, Colo. The work was done by the Center Soil Conservation District, a cooperative organization whose purpose is to provide this service at a reasonable cost. Formerly waste land, unfit even for grazing, it will become cropland worth about \$200 an acre. The cost of leveling was \$25 per acre to the owner, who also paid for drilling a single well at one end of the field. The cooperative, formed in 1946, owns and operates four International TD-18A diesel crawlers and one Caterpillar D-7 diesel tractor. Since its inception, the organization has leveled 5,000 acres for irrigation in Colorado's fertile San Luis Valley.



DIESEL PROGRESS



## BIG LOSS if engine heat travels this little extra distance!

A 1/16 in. thick deposit of calcium carbonate in the jacket of an engine hinders heat transfer to the cooling water as much as 3-3/16 in. of cast iron.\* That's why scale deposits mean poor cooling...decrease engine efficiency.

With Binks closed type heat exchange coils (installed in a Binks cooling tower), you can economically use soft or treated water for cooling purposes. You simply circulate it through a closed system from jacket to coil and back. No scale forms, breakdowns are reduced, insurance cut.



Binks Type "D"  
Coils are built of  
heavy 1" O.D. copper  
tubes and are  
self-descaling

### SEND FOR BULLETIN 41

Gives complete details, drawings and tables of heat exchange coils adaptable to a variety of diesel operating conditions.



\*Courtesy, D. W. Hoarling and Co., Inc.

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3132-38 Carroll Ave., Chicago 12, Ill.  
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## Rotary Geared Pumps

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FLANGE

MOUNTINGS



Here's a line of pumps that simplifies installation problems in diesel lubrication or fuel transfer. Brown & Sharpe Rotary Geared Pumps Nos. 1, 2, 3, 4, 1S, 2S, and 3S can be furnished with flange mountings for practically any mounting condition. They are especially useful where it is desired that the pump be an integral part of the engine or machine. Write for complete catalog or details on how these pumps may be used to solve your special problem. Brown & Sharpe Mfg. Co., Providence 1, R.I., U.S.A.

*We urge buying through the Distributor*

**BROWN & SHARPE** B.S.

# Bendix-Skinner

ORIGINATOR OF MICRONIC FILTRATION

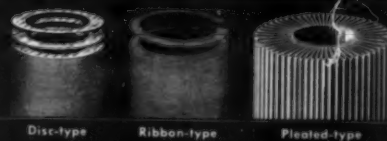
## the Finest

### Answer to Any Filtering Problem



For over twenty years **Bendix-Skinner** has specialized in solving the filtering problems that "couldn't be done." From this experience has come entirely new and exclusive filtering techniques which do even the work-a-day filtering jobs better and at lower long-range cost. Tell us about your problem—nine times out of ten **Bendix-Skinner** filters will supply the "finest" answer.

Over 350 Models providing filtration  
from 1/2 micron (.000019") upwards  
at flow rates from 1 to 5000 g.p.m.



Disc-type

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## Appointed Chief Engineer



**Louis J. Garday** has been appointed chief engineer of diesel fuel injection equipment by Scintilla Magneto Division, Bendix Aviation Corporation, Sidney, N. Y. Recently associated with Busch-Sulzer Bros., diesel engine division of Nordberg Manufacturing Co., as consulting engineer on combustion and fuel injection problems, Mr. Garday was formerly chief engineer of Aircraft and Diesel Equipment Corp. of Chicago.

Ill., manufacturers of "Adeco" fuel injection pumps and equipment. Mr. Garday brings to Scintilla a life-time of experience in the internal combustion and diesel engine field and will be in charge of the design and development of Bendix fuel injection equipment for diesel engines, both individual cylinder and automotive types.

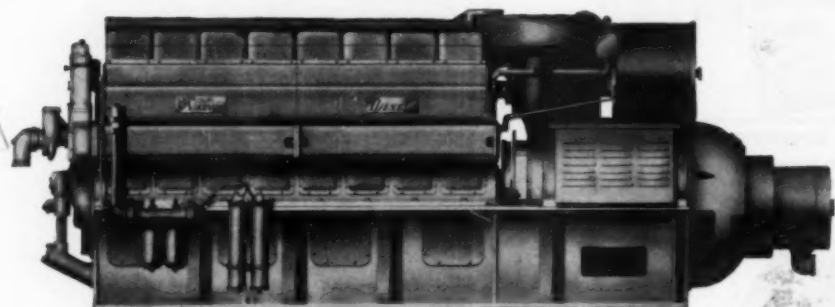
## Terminates Distributorship

Aeroquip Corporation, Jackson, Michigan, manufacturer of Flexible Hose Lines and Self-Sealing Couplings, has terminated arrangements with its South-Southwest United States distributor, Aeroquip Sales and Engineering, Inc., Fort Worth, Texas, effective January 31, 1952, after which that

company no longer has the right to use the name "Aeroquip." Beginning February 1, Aeroquip's customers throughout the new territory covering 14 states were contacted directly by specially trained sales engineers operating from Aeroquip Corporation and its wholly owned subsidiary, Aero-Coupling Corporation, Burbank, California.

This shift in Aeroquip's distribution system was brought about by changing economic conditions and the current rearmament program. Aeroquip's management believes that the new arrangement will better maintain the company's proven service and quality, and achieve a closer relationship between the factory and the customer. The first unit of Aeroquip personnel in the area, formerly served by Aeroquip Sales and Engineering, Inc., will include Edison D. Heins, District Manager Industrial Sales, and James Tilford, Sales Engineer, Dallas and Houston, Texas; Jack Harlow, Sales Engineer, Birmingham, Alabama; William Pickens, Aircraft Staff Engineer, Wichita, Kansas; and John McCarthy and Victor Emery, Sales Engineers, Kansas City and St. Louis, Missouri.

# Sterling Viking Diesels definitely lower costs of power production



Model VDS-8S, 600 KW Generator Set. Viking Diesel "packaged unit" generator sets are available in 6 and 8 cylinder models. Bulletins 1024 and 1028 contain sectional views, fuel consumption curves, engineering and installation details. Sent on request.



We have the evidenced facts to show any user of diesel electric generator sets that the newly engineered Sterling Vikings can cut KW hour production costs as much as 50 per cent.

Fuel consumption, engine weight, compactness, housing, installation, parts cost, general maintenance—all are factors in the service

worth of a generator set. On every point Vikings offer proven advantages confirmed by comparison. In diesel engineering, Sterling has come up with design developments that have the industry talking. We would like to give you this story of lower power costs first hand. Write us for latest Sterling Viking Diesel literature.

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**ENGINES**

Diesel, Gasoline, Gas — 4, 6 and 8 cylinder — 30 HP to 1,000 HP

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● Depend upon Sterling Diesel Power for Locomotives, Generator Sets, Commercial and Fishing Craft, Lift Bridges, Ventilating Systems, Drilling Rigs, Etc.

## Improvements on GE Railroad Switchers



Three new 70-ton GE switchers operate in multiple.

Improvements designed to reduce maintenance costs and increase availability have been announced for the 1952 model of General Electric's 70-ton, 600-hp. diesel electric switching locomotive. Among the new model's four design changes is the replacement of the former single-stage water-cooled air compressor with an air-cooled 2-stage belt-driven compressor. General Electric engineers add that simplified piping, higher efficiency and cooler operation are advantages of the new compressor. New power contactors have been installed to increase the continuous rating and triple the contact life, engineers say. The contacts are designed to be resistant to welds, and the new contactors also have non-bouncing armatures.

A single relay replaces the original two types of transfer relays, resulting in the elimination of two interlocks in the high voltage circuit. The number of parts needed for maintenance, engineers say, has been simplified by using identical relays for shunting and transition control. The simplification of gage panel parts and rearrangement of the gage panel also highlight this new G-E railroad locomotive model.



DIESEL PROGRESS

## Mile-High Crusher



Producing a mixture of sand and crushed stone, this crushing plant near Boulder, Colo., is operated by the Winslow Construction Company and supplies 600 to 700 tons of sand cushion material daily to the Kooler Construction Company of Denver, paving contractors on the four-lane Denver-Boulder turnpike. The plant equipment consists of an International TD-18A crawler tractor and bulldozer which pushes raw rock to a one-yard Lima dragline. The dragline feeds a Cedarapids crushing plant, powered by a 125-horsepower International UD-18A diesel engine, and the finished material is handled either by a Pettibone-Mulliken loader which fills the haul trucks or is pushed by the TD-18A to a large stockpile nearby.

## Brown & Sharpe Catalog

Brown & Sharpe Manufacturing Company of Providence, Rhode Island has issued a new catalog. This catalog, designated as Catalog No. 35, is in the large "standard" size and contains 224 pages. It presents the complete Brown & Sharpe line of small tools; machinists' tools, electronic measuring equipment, gages, Johansson gage blocks, milling cutters, hobs, arbors, adapters and collets, screwmaking tools, pumps and other widely used shop items including ground flat stock, vises and permanent magnet chucks.

Included with the catalog is a copy of the company's new price list containing the new ordering system which establishes product identification of every item in the new catalog, regardless of type, size, style or variation. It reduces ordering to the minimum and expedites handling of orders.

## Develops Improved, Non-Toxic Dy-Chek Formula

Completion of a new, improved and non-toxic Dy-Chek formula was announced recently by President S. G. Thornbury, Turco Products, Inc., manufacturers of the dye penetrant inspection process. "Interest in our metal inspection process has increased so substantially in the period that has elapsed since we assumed the manufacturing and distributing functions of Dy-Chek," Thornbury said, "that our large staff of research chemists has aimed at developing even more sensitive dye penetrant inspection materials. We are pleased to announce that this project has now been completed and that all Dy-Chek materials bearing the Turco label are of this non-toxic, non-hazardous formula."

The Dy-Chek method of inspection is basically a "hide and seek" process. After pre-cleaning, a red

dye is applied to the surface being inspected. After being allowed to dwell sufficiently long for it to "hide" in any flaw or defect—no matter how small—that extends to the surface, the dye is removed from the surface of the part being inspected. A white developer is then applied to the surface being inspected. This developer, as if by magic, "seeks" out the dye "hidden" in the flaw. As the developer dries, it pulls the "hidden eye" to the surface. The red dye thus bleeds into the white developer, marking with photographic clarity any defects—as well as their extent—that may be present. Chief advantages claimed for the Dy-Chek process over other available methods are its relative inexpensiveness—no special equipment, royalty or licensing fee is required; its application to both ferrous and non-

ferrous metals; its portability; and its accuracy.

Dy-Chek is not only applicable to mass production inspection of parts under factory conditions, but it is unique in that it can be used by a single mechanic or inspector in examining parts in the field.

It can be applied by any convenient method—spraying, dipping or brushing. Easy to use, any personnel can be trained to use the process in a very short time. Complete information and literature describing varied applications of Dy-Chek and how this revolutionary chemical process simplifies non-destructive testing may be obtained from Turco Products, Inc., Terminal Annex 2649, Los Angeles 54, California.

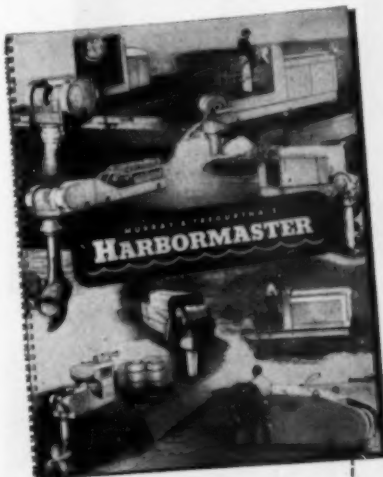
# OUTBOARD PROPULSION UNITS CAN SAVE YOU MONEY

**Compare the Money-Saving Performance of the HARBORMASTER Outboard Unit in the Marine Industry Before You Build, or Before You Re-power**

**IT** will pay you to investigate the advantages of outboard power the very next time marine motors are up for discussion.

The Harbormaster Outboard Propulsion and Steering Unit brings powering of barges, towboats, tugs, lighters, derricks, ferries, etc. to a new high peak of efficiency. Hundreds of these heavy duty units are in daily operation. Operators are saving thousands of dollars in many marine applications because of the natural advantages of outboard propulsion.

How fast can you get there, and how much pay load can you carry? These are the questions you need to have answered, and in the great majority of cases you will find the best answer in the Harbormaster. You get the ultimate in maneuverability with Harbormaster, which allows you to steer instantly with full power in any direction, through the patented M&T 360° Propeller Thrust Steering Control. You get tremendous savings in fuel expense because you have more thrust per horsepower.



**Murray & Tregurtha  
HARBORMASTER  
Outboard Propulsion  
And Steering Units**

Important features that save time and money include exclusive 180° Elevating Mechanism which allows 1-man operator to easily maintain and service the equipment; and Patented Shear Pin, which automatically shears off should underwater assembly strike a submerged obstacle, thus opening up vast new shallow water fields to continuous, reliable operation. Harbormaster models, for all marine purposes, are available in sizes from 20 to 300 h.p. engines, gas or diesel power.

You'll find this data, and further valuable information, in our comprehensive catalog containing over 70 photos and diagrams. Gladly sent you on request, whether you have immediate or future use for Harbormaster units. Why not write for the catalog now so that you will have full information on file?

Murray & Tregurtha, Inc.  
6 Hancock St., Quincy 71, Mass.

Please send catalog, without obligation, covering the HARBORMASTER Outboard Propulsion and Steering Unit.

Name.....  
Company.....  
Address.....

## Forms Subsidiary Corporation



C. F. Reeves

The De Laval Steam Turbine Company, Trenton, New Jersey, has announced the formation of a subsidiary corporation, the De Laval Turbine Pacific Company. Headquarters for the company will be in the new building at Main and Folsom Streets, San Francisco, California, which was erected by the parent company in 1951. Officers of the new company are: Mr. G. W. Smith, Jr., chairman; Mr. J.

P. Stewart, president; and Mr. C. F. Reeves, vice president and general manager. Mr. Reeves will be in direct charge of operations of the company, continuing the duties he has held for many years as west coast manager of De Laval Steam Turbine Company. Branch sales offices are located in Los Angeles under H. H. Reynolds and in Seattle under Mr. J. A. Greenland.

The San Francisco headquarters building includes warehouse facilities for standardized De Laval products, including centrifugal and Imo rotary pumps, speed reducers, couplings and spare parts, together with shop facilities for local handling of repair and service orders. In addition to the complete line of De Laval equipment, the new com-

pany will act as authorized representatives for Waukesha industrial engines, Kellogg-American air compressors, and Diehl electric motors and other allied industrial lines.

## Appointed Sales Manager

Appointment of Fred H. Kroeger as sales manager in charge of power brakes and devices for the Marvel-Schebler Products Division of Borg-Warner Corp. has been announced. Mr. Kroeger previously was a sales executive of the Bendix Division of Bendix Aviation Corp. at South Bend, Indiana. A mechanical engineering graduate of the University of Missouri, he served in the Ordnance Department of the U. S. Army throughout World War II and rose to the rank of lieutenant-colonel.

# NEW

## continuous protection for your diesel engine

The new Alnor Pyrotac brings you the constant protection you've been wanting for your Diesel engine—an instant check of all cylinder temperatures, at a glance.

This precision-built instrument continuously monitors exhaust temperatures . . . automatically checks each cylinder every minute. Watching the pyrometer scale from as far away as 20 feet, you can instantly tell if any one cylinder is out of balance . . . allows supervision by a minimum force. The instrument can be wired to an alarm circuit to warn of excess temperatures and automatically shut down the engine when maximum safe temperatures are exceeded. The pointer on the selector switch will stop at the number of the offending cylinder . . . exactly locating the source of trouble.

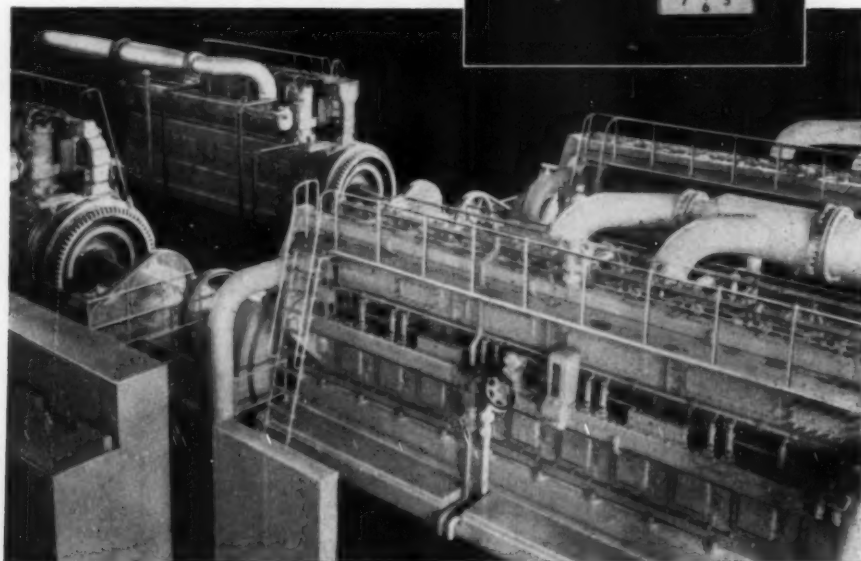
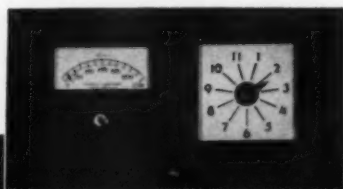
Such automatic, constant protection reduces maintenance time and expense to a minimum—increases efficiency and operating economy.

The Pyrotac presents many opportunities for improved instrumentation in the Diesel and gas engine field. It can be used to warn of excess temperatures in cylinders, entire engines, overheated bearings, burn-out danger in fields of large generators, etc. Why not ask for Alnor assistance in solving your pyrometer problems today? Illinois Testing Laboratories, Inc., Room 508, 420 N. La Salle St., Chicago 10, Ill.

THE ALNOR PYROTAC  
available in several  
multi-circuit models.

Alnor

PRECISION INSTRUMENTS  
FOR EVERY INDUSTRY



## "All-round" Cam Bearings



Recognizing that replacement parts for diesels require better-than-average precision and tolerances, the Dura-Bond Bearing Company of Palo Alto, California, is currently expanding its line of "all round" camshaft bearings for diesel engines. According to the company, the "all round" has greater precision and closer tolerance than any other type of cam bearing. Manufactured from steel tubing instead of the usual flat steel sheets, the bearing has no split to distort its tolerance perfection and is therefore unlike the split of inter-lock types. By the use of steel tubing, an absolutely true round is achieved.

The manufacturer states that the extraordinary precision of the "all round" has several distinct advantages, including: superior performance, since perfect tolerance assures an even and constant distribution of oil; faster installation, owing to the grinding and polishing of the O.D. that lets the bearing slip easily into the block, easier installation, since there are no loose ends to force together; and maximum economy, the result of faster easier installation, superior performance and the absence of any split which eliminates the danger of damaging the bearing during insertion into the block.

By mid-1952, the Dura Bond Bearing Company anticipates that its line will include virtually all numbers for the great majority of diesels. "All round" camshaft bearings for diesel engines are now packed in sets in special set-up boxes. The boxes, printed green with a varnish overprint and featuring the Dura Bond trademark, measure 6½ inches by 6½ inches by 2½ inches. Normally packaged in sets, the Dura Bond "all rounds" are also available in bulk pack when required. The distinctive package design coupled with its bright green color gives exceptional bin or shelf visibility.

DIESEL PROGRESS

## Town Gives Residents Bonus

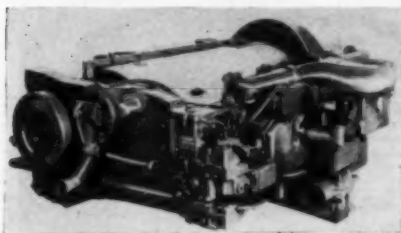
The Mora, Minnesota, municipal diesel plant has been paying big dividends to this community since 1935 when they installed their first diesel generating plant. Last Christmas, the town's Public Utilities Commission gave residents an additional bonus. All December bills were sent out marked "paid in full." It was a Christmas present of \$10,000 worth of free electrical power. Edward R. Kent, supervisor of the diesel plant, said that the gift was made "in observance of another excellent year financially."

## Ring Sets For Large-Bore Diesels

Operators of diesel engines of large bore can get from Wilkening Manufacturing Co., Philadelphia 42, Pa., individual ring designs claimed to be latest and best, and also complete ring installations engineered for the longest life with minimum oil consumption and high power output. These complete engineered sets are said to exploit fully the great potentialities of latest ring designs, especially the flexible or conformable oil rings, for each particular type of big-bore engine. Each set has been worked out and applies to only one model of engine. The sets are made up in cylinder units so they can be ordered easily for any of the multiple-cylinder combinations in service.

A distinguishing characteristic of Pedrick engineered sets for big-bore engines is the use of latest designs of flexible oil rings. An entirely-different peripheral-abutment-type expander called an "Equalizer" is used. It does not contact the bottom of the piston groove. It is claimed to have other important advantages, such as: absolutely uniform pressure distribution around the entire circumference of the ring; greater oil drainage because of open construction; the utmost in conformability to wear and distortion in cylinders and piston grooves; independence of variations in groove depths. These characteristics are said to help to prevent wear, induce long life and reduce oil consumption to a minimum.

## New Horizontal Cummins Diesel



Following thousands of service proven miles, Cummins Engine Company, Inc., at Columbus, Indiana, announces the availability of the new horizontal 200 hp. Model NHHB-600 Cummins diesel. This latest addition to the Cummins line of 84 models of lightweight, highspeed diesels has been designed especially for city and intercity buses, as well as rail car applications. The NHHB-600 is a 6-cylinder, full diesel, which produces 200 hp. at 2100 rpm. and with a compression ratio of 15.5 to 1. Displacement is 743 cubic inches, with a bore and stroke of 5 1/4 inch x 6 inch. Weight is 2285

pounds. Dimensions of the new engine are: Length—63 1/4 inches; Width—55 1/4 inches; and Height—22 3/4 inches. This size makes the engine adaptable for underfloor installations in buses and rail cars.

The White Motor Company, Cleveland, is standardizing on the NHHB-600 in its new 44-50 passenger transit bus, Model 1100D. In demonstrations from coast-to-coast, these Cummins powered buses have improved mileage from six to 43 per cent over competitive diesels, and have more than doubled the miles per gallon of gasoline engines. In addition the diesel fuel recommended for use in the Cummins NHHB-600 is lower priced than the fuel burned in most other types of diesel coaches now in operation. ACF-Brill, Philadelphia,

is currently offering their model IC41 highway coach with the NHHB-600 Cummins diesel. Continental Trailways has used NHHB-600's in re-powered IC41 ACF-Brill 41 passenger intercity buses for nearly a year on a run between Dallas and Los Angeles. Fuel consumption has averaged more than eight miles a gallon during this period.

As a result of this performance, Continental is re-powering a fleet of ACF-Brill coaches, and is also purchasing new Cummins powered model IC41 buses from ACF-Brill. Busmen attribute these high mileage figures achieved by Cummins diesels in transit and highway coach service to the exclusive Cummins fuel system which features the recently announced DD (double disc) fuel pump.

# SARCO cooling controls

FOR DIESEL ENGINE  
JACKET WATER &  
OIL COOLERS

Two 4" Sarco,  
type 23-509M,  
Cooling Controls  
on Fairbanks-  
Morse Diesel en-  
gine at Seaford  
Light and Power  
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Hook-up for engine  
jacket control  
using Sarco type  
23 regulator with  
3-way valve to re-  
circulate a vary-  
ing portion of the  
cooling water.

Sarco type 23  
Cooling Control  
with 3-way diver-  
sion valve No.  
509M. Available  
also with 2-way  
piston valves, re-  
verse or direct ac-  
ting (by-pass con-  
trol), in sizes 1/2"  
to 6".

**SARCO** offers a complete line of self-operated Temperature Regulators for use on internal combustion engines for stationary, marine and locomotive application.

Their distinguishing feature is the use of

## Liquid Expansion Thermostatic Systems . . .

In these systems, the thermostat bulb, connecting tubing and valve-closing element are completely filled with mineral oil.

Expansion of this oil, when heated, pushes forward a plunger in contact with the valve discs, thus positioning the valve.

Since the valves are double-seated and fully balanced, they can float on the line, providing gently throttling control.

The power for moving the valve is uniform per degree temperature rise at any point of the scale.

Sarco regulators are not limited to standard ranges. Each regulator is factory set for the exact operating temperature desired. It can then be adjusted by the user both higher and lower as required.

Sarco controls are built with packless seals eliminating the necessity of replacing packing from time to time.

Write for Sales Sheet No. S1429.

Sarco type 13W  
Air Eliminators  
prevent air pocket-  
ets in water lines.



Sarco Pipe Line  
Strainer.

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REPRESENTED IN PRINCIPAL CITIES

343



## DIESEL YACHT "VICTORY"

**C**HRISTENED in Rotterdam, Holland in 1937 and repowered with Gray diesels in Fort Lauderdale, the yacht *Victory* is a dream home afloat. The hull is 74 ft. by 20 ft. by 9 ft. and made of Swedish iron cold rolled and cold riveted, non-rusting, non-corrosive, with teak decks over steel plates. Installation of the two Gray 225 hp. diesels was done by Al Kirwan at Paul's Boat Yard under the watchful eye of Capt. John Nielson, its owner. She is also equipped with Twin Disc 1.5:1 reduction gears, 24 volt Delco Remy starters, generators, and batteries, with Philco Submarine batteries for the 115 volt ac. system.

The main deck contains pilot house and lounge with a small bar from the French liner *Normandie*; on the open deck is a space for a small automobile. Below, it is luxuriously equipped with two staterooms. The galley, forward of the engine room, contains a deep freeze, refrigerator, electric hot water heater and stove. The bridge contains the usual engine room instruments plus a complete set of navigational aids, such as Sperry fingertip steering, Submarine Signal fathometer, Clinometer, Bendix radio home finder, 100 watt ship to shore Hallicraft telephone and telegraph and many others. Her full speed has not been tested but Capt. Nielson enjoys cruising at 14 knots.

## Honan-Crane

### Oil Purification

...first choice to protect all 80 Nordberg Diesels at Kaiser Aluminum's huge new Chalmette Plant

In the giant Kaiser Aluminum and Chemical Corp. plant 80 Honan-Crane Oil Purifiers maintain a continuous supply of clean, safe cylinder and crankcase oil for 80 eleven-cylinder, 1820 HP Nordberg gas engines. Again, experienced diesel engineers have specified Honan-Crane for safe, dependable protection against breakdown and excessive wear due to contaminated oil. Honan-Crane Oil Purification (for either inhibited or straight mineral oils) protects bearings, cylinder walls and other finely machined parts from improper lubrication and costly damage often caused by solid abrasive contaminants or by acids, gums, resins and other products of oxidation. Write today for complete information about Honan-Crane Fuel and Lube Oil Purifiers.



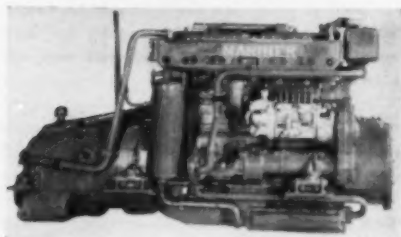
**Honan-Crane Corporation**  
202 Indianapolis Ave., Lebanon, Indiana  
A Subsidiary of  
**Houdaille-Hershey Corporation**



Shown above: One of the two engine rooms in the Kaiser plant. Each room contains 40 Nordbergs and 40 Honan-Crane Oil Purifiers.



## Mack and Palmer Announce The Palmer Mariner Diesel



An interesting prelude to the New York Motor Boat Show was the announcement on January 9, of an agreement between Mack Trucks, Inc., and The Palmer Engine Company whereby Palmer has exclusive right to purchase Mack diesel engines and convert them for marine use. Taking the name of the former Mack marine engines, several hundred of which have been in service a number of years, the new line will be offered to the marine trade as the Palmer Mariner diesels. The first engine in this line was exhibited at the Boat Show, a 672 cu. in. unit,  $4\frac{3}{4}$  in. bore, 6 in. stroke, rated 140 hp. at 1800 rpm. for intermittent service and 120 hp. at 1600 rpm. for continuous service.

The basic engines will be supplied by Mack and Palmer will adapt them for marine use by adding reverse and reduction gears, making necessary changes in the cooling system, lube oil system and adding the required marine accessories. These are six-cylinder, 4-cycle, engines featuring simplicity in design, low fuel consumption, smooth performance, compactness and easy accessibility. The cylinders are cast in block with dry liners, and are fitted with two detachable cylinder heads. The pistons are aluminum alloy. There are seven interchangeable copper-lead babbitt main bearings and the connecting rod bearings are of the same material. The engines are fitted with American Bosch multiple unit fuel injection pumps, Woodward hydraulic type governor and Twin Disc clutch and reverse gear.

Under this new agreement, two nationwide distributor organizations will join forces. Palmer has outlets in nearly all port cities and more than twenty of Mack's fifty direct factory branches are located in port cities. Of Mack's 450 distributors, many are also in coastal cities. The two organizations are geared to work together closely on sales and service. Palmer will purchase replacement parts for Mack marine engines direct from Mack's Service Parts Division and will supply these parts to Palmer representatives.

E. D. Bransome, President, Mack Trucks, Inc., and R. C. Bolling, President, The Palmer Engine Company, both see a substantial future in the marine field for this line of Palmer Mariner diesels. They are especially pleased with the agreement that has been worked out between their companies whereby the marine trade will enjoy the benefit of the combined experience of two long established builders of quality products.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.

MARCH 1952

## For **DEPENDABILITY** IN **TRANSPORTATION**



### The Correct Fastener for the Job

These Erie bolts have at least one thing in common—they are designed to hold against maximum strains imposed by pressure, temperature, or corrosion. They differ in material, shape and threading as the job directs. For 38 years, we have goared our plant to manufacture these unusual high quality bolts to exacting specifications.

This broad experience backed by a high desire to be of service to you is your assurance that Erie is ready to meet your special bolting requirements.



**ERIE BOLT and NUT CO.**  
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*Representatives in Principal Cities.*

## THE MOTOR BOAT SHOW

The 42nd National Motor Boat Show opened in New York promptly at 7 P.M. January 11 with the traditional sounding of the bosun's whistle by George W. Codrington, vice president of General Motors and president of the National Association of Engine and Boat Manufacturers.

"Made fast" to the four exhibition floors of Grand Central Palace were 26 cruisers, 30 inboard runabouts, 41 sailboats and nearly 150 dinghies, prams and outboard runabouts. Flagship of the show was a 48 foot Wheeler promenade cruiser with four cabins accommodating up to ten people and quarters in the fo'c'sle for crew of two. She is powered with a pair of 200 hp. General Motors geared diesels giving her a speed of 20 to 22 miles per hour.

Half of the twenty-two engine exhibits featured diesel engines ranging from the light weight, high output submarine diesel, exhibited by Cleveland Diesel Engine Division of General Motors down to single cylinder auxiliary power and generating units.

Gray Marine Motor Company featured a new 6-cylinder, lightweight diesel of 100 hp. at 2200 rpm. for continuous duty using aluminum housings and fitted for fresh water cooling.

Detroit Diesel Division of General Motors exhibit was dominated by a glass enclosed, motorized cut-away of 6-71, 275 hp. diesel graphically demonstrating the operation of all working parts. Back-

ing up the exhibit was a display board mounting a full line of engine parts. Also shown were a matched pair of 200 hp., right and left hand rotation marine propulsion diesels, a small auxiliary diesel generating unit and three diesel propulsion units.

Palmer Bros. Engine Corporation gave prominence in its exhibit to the newly acquired Mack diesel converted for marine use, henceforth to be known as the "Palmer Mariner." Also shown was a single cylinder, 9 hp., 1000 rpm. diesel for powering deck machinery.

Nordberg Manufacturing Company, occupying one of the larger exhibit spaces, featured its 4-cycle, 6 cylinder, turbocharged marine diesel rated 480 hp. at 720 rpm. Shown for the first time was a 45 hp., 3 cylinder auxiliary marine diesel generating unit. One and two-cylinder, 4-cycle diesel marine propulsion units were also shown. These are available for auxiliary generating application with either ac. or dc. generators from 6 to 30 kw. in standard voltages.

Kermath Manufacturing Company showed five diesel marine conversion units in two, four and six-cylinder models, the largest of which is rated 190 hp. at 1600 rpm. for continuous service and 250 hp. for intermittent use.

The Diesel Division of Harnischfeger Corporation exhibited its Model 687-CM, 2-cycle marine diesel

fully equipped for fresh water cooling and fitted with Twin Disc reverse and reduction gear also front auxiliary drive.

Caterpillar Tractor Company occupying its usual large corner featured its new 6-cylinder marine diesel of 170 hp. at 2000 rpm., equipped with gasoline starting engine. Also shown were the V-8 and V-12 marine diesel models equipped with reverse and reduction gears, of 270 hp. and 400 hp. respectively at 1200 rpm.

Red Wing Motor Company exhibit included one medium duty diesel marine conversion rated 30 hp. at 1800 rpm., a 4-cylinder, 4-cycle unit of 129 cu. in. displacement for propulsion.

Among the more than 220 exhibits were many accessories associated with engine manufacture and operation including American Bosch Corporation and Scintilla Magneto Division of Bendix Aviation Corp. who exhibited fuel injection equipment and testing devices; Maxim Silencers; Fram filters; Electric Auto-Lite generators, starting motors, switches, marine batteries; Columbian Bronze Corp. hydraulic throttle control with worm-type drive for transmitter piston, for application to heavy diesel engine governor loads, also engine clutches; Esso, Socony-Vacuum and Gulf fuels and lubricants; L. O. Koven tanks universally tapped for gravity or vacuum use; Palmer Bros., single unit electric starter which becomes a generator after starting the engine, water jacketed engine

### OVERSPEED GOVERNORS



Synchro-Start Overspeed Governors are made for shut-down at any predetermined RPM by either opening or closing a circuit and speed can be adjusted while the engine is running.

Rotating parts of the GF's run in sealed ball bearings, lubricated for life and equipped with tachometer drive take-off.

Rotating parts of the GK's run in two oil-less bushings and are adapted to standard SAE coupling or gear drive.

All models can be mounted in any position and an angle drive attachment can be furnished for GKA and GKM.

For further information write for Bulletins 409 and 409-A

**SYNCHRO-START PRODUCTS, INC.**  
8151 NORTH RIDGEWAY AVENUE,  
SKOKIE, ILLINOIS.

### TUNA CLIPPERS



*Install THE Wixkuler*  
Reg. U.S. Pat. Off.



**LARGE WIXKULER FOR 650-HP. TUNA CLIPPER**

Standard in the Tuna Clipper Fleet. WIXKULER Heat Exchangers for main diesel engines or auxiliaries, range, 20 to 800-hp. Larger sizes to order.

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**WIX Cooler Co.**

2900 Westlake North      Seattle 9, Wash.

manifolds and oil coolers; Snow-Nabstedt marine gears; Surtette storage batteries ranging to sizes capable of starting diesel engines up to 1800 hp.

The show was one of the best attended in recent years. Exhibitors reported lively interest and a buying mood.

### Young Radiator Catalog Folder

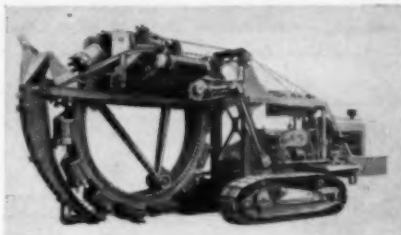
Available from the Young Radiator Company of Racine, Wisconsin is a colorful catalog folder detailing the company's heat transfer products. It lists and gives descriptions and photographs of the varied units manufactured by the company. It includes unit heaters, radiators, heat exchangers, cooling and condensing units, air conditioning equipment and other products. Capacity tables and dimensional drawings are included with the material.

### Nordberg Bulletin

Design and operation features of the Nordberg one, two and recently introduced three cylinder Type 4FS diesel engines are illustrated and described in a new 12-page, two-color bulletin published by Nordberg Manufacturing Company, Milwaukee 1, Wisconsin. Built for continuous duty or standby service, the Nordberg 4FS diesel engines described in Bulletin 194 have  $4\frac{1}{2}$ -inch bore and  $5\frac{1}{4}$ -inch stroke and are of the four-cycle, vertical mechanical injection type. The units range from 10 to 45 hp. within an operating speed range of 1200 to 1800 rpm. Nordberg 4FS diesel engines are

offered as complete, self-contained, ready to operate units with generator, pump or power take-off for direct connection or belt drive. Also contained in the bulletin are pictures showing all main engine parts and complete engine specifications. It also describes the low fuel consumption, full pressure lubrication, efficient cooling systems, electric and manual starting equipment and other features of the engines. Bulletin 194 is available, free upon request.

### Announces 2 New Wheel-Type Trenchliners



With extensive field tests completed, Parsons Company of Newton, Iowa, has started full scale production on two new models of Trenchliners. Both are full crawler-mounted, wheel-type machines. Model 202, pictured above, is designed primarily for drainage and utility trenching. Model 215 is a special pipeline Trenchliner. With a choice of either 52 hp. gasoline or 55 hp. diesel engine, the Model 202 is equipped to dig in 30 separate feeds from 6.2 inches to 18.5 feet per minute; and in 9

widths from 13 to 31 inches wide and up to 6 feet deep. Other features include: friction clutch control of digging wheel, easily changed bucket-fronts with cutting lips or "Tap-In" teeth, shiftable and reversible belt conveyor for discharging spoil on either side of machine.

Full crawler mounted, with either 16 or 20 inch treads, the Model 202 Trenchliner has only 5 to 6 pounds per square inch ground bearing pressure. This is particularly important on drainage, irrigation, municipal and utility-type projects for which the machine is particularly designed. For laying drainage tile, a special box and chute are available as optional equipment.

Parsons companion Model 215 has several outstanding features designed for "mile-a-day" production on cross-country pipeline installations: six digging wheel speeds up to 11.2 rpm., standard-make tractor type crawlers with lug-type shoes, 18 inch treads, and choice of two standard-make 55 hp. diesel engines.

Additional information and specifications on both new models may be obtained by contacting any Parsons Trenchliner distributor, or by writing direct to the Parsons Company at Newton, Iowa. Parsons is a subsidiary of the Koehring Company, Milwaukee 16, Wisconsin.

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 MARCH 1952

## Diesel-Electric Locomotive Proves Profitable



The Atlantic and Western Railway Company of Sanford, N.C., has increased its revenue while saving more than \$700 a month on fuel since replacing

two steam locomotives with a single General Electric diesel-electric 70-ton switcher. The new diesel electric locomotive was put into service more than a year ago on the line which connects the Atlantic Coast Line, Seaboard Air Line and Southern Railroad at Sanford with the Norfolk Southern at Lillington, N.C.

E. T. Ussery, general manager of the 24-mile line, points out that with steam locomotives the Atlantic and Western in the first nine months of 1950 realized a net profit of \$5,387.12, after taxes and all fixed charges. For the fourth quarter alone, with the G-E diesel-electric running, the Atlantic and Western operated with a net profit of \$5,537.26. Operating costs decreased \$4,932.30 in the first

three months of diesel-electric operations. The railroad realized a saving in fuel cost of \$750 a month in 1950 after putting the 70-tonner into service. Fuel saving from January through April, 1951 averaged \$706.09 per month, Mr. Ussery said.

## National Supply Appointments



Charles K. Olson



P. W. Place

Charles K. Olson has been appointed assistant general manager of the National Supply Company's Engine Division, Springfield, Ohio. It has been announced by F. Howard Kilberry, general manager. For the past 19 years Mr. Olson was associated with the Whitcomb Locomotive Company, division of Baldwin-Lima-Hamilton Corp. He was assistant vice president and general manager of that company when he resigned. New staff assistant to the general manager is P. W. Place. Mr. Place joined the company in 1941 after graduation from the University of Wisconsin. Following a series of engineering positions, he took charge of all field service and will continue to handle this along with his new duties.



J. D. Myers



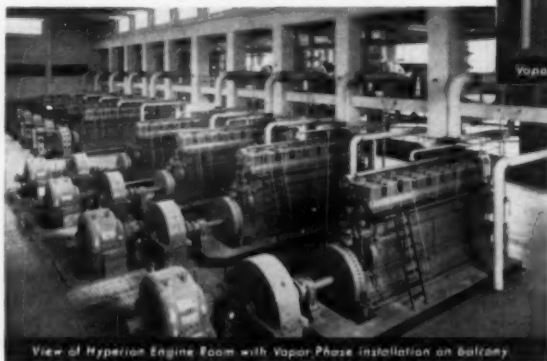
P. A. Groeber

J. D. Myers has been named general superintendent. Mr. Myers joined the company in 1936 as a drilling machine operator and became machine shop supervisor in 1942. His new assignment gives him direct charge of all plant functions, including jurisdiction over all shifts. Newly appointed general superintendent for all night shift operations is P. A. Groeber. Mr. Groeber joined the company in 1934 as a toolmaker inspector and since 1941 has been foreman of the machine shop.

## FREE POWER & HEAT

**2 YEARS'** continuous operation in the world's largest, most modern Hyperion Sewage Treatment Plant, City of Los Angeles, provides added proof of the unquestionable efficiency and economy of VAPOR PHASE.

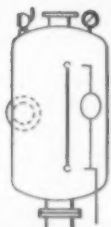
*Let's check the records...*



**96.4 percent** of fuel used to power these nine huge engines is raw sewage gas. No cost here!

**3.6 percent** of fuel used is cheap pilot fuel!

**3500 pounds** low pressure steam, developed per hour, heats all sludge, plant space and what-have-you, free!



That's the two-year record of the nine Vapor Phase equipped Worthington dual-fuel engines at Hyperion. And there's just one cost—pilot fuel.

Ordinarily, raw sewage gas fuel destroys engine life in a matter of months. Vapor Phase has changed all that!

For instance, a Vapor Phase equipped Enterprise engine in the Visalia, California Sewage Plant has operated con-

tinuously on this harmful untreated acid fuel for twelve and a half years—well over 100,000 hours. All original cylinders, pistons and inlet valves still serving!

Regardless of fuel or operating requirements, whether old or new engines—any engine generating plant may be Vapor Phase equipped quickly, efficiently and at a surprisingly low first cost.

Vapor Phase functions automatically...

VAPOR PHASE equipped engines also serve to generate steam, heat fluids, space or other process, and cool via air conditioning—each as required or all at the same time.

## AND ALL IT COSTS IS FUEL FOR THE ENGINES!

Sizes available for any individual or group of Diesel, Gasoline or Gas engines.

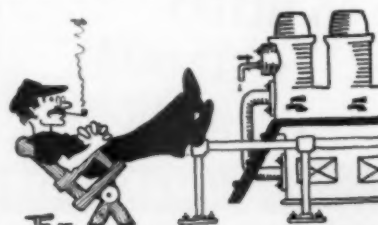
**VAPOR PHASE** pays off in Savings alone, the first year. The unit costs nothing to operate and is good for life.



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**DIESEL PROGRESS**

## Florida Diesel News

By ED DENNIS

ANOTHER FIVE INTERNATIONAL Harvester diesel tractors for the Abaco Logging Co. at Pine Ridge in the Bahamas. One TE 24; one TE 9 and three TE 6's, supplied by Florida-Georgia Tractor Co. of Miami.

A NEW 68-FT. SHRIMPER for Stephen Lipka of Fort Meyers, built at Nix Boat Yards of St. Augustine, powered with a Caterpillar 170 hp. Snow-Nabstedt 4.4:1 reduction gears, battery starting and keel cooling. Shelly Tractor and Equipment of Tampa engineered the job.

DIESEL SALES CO. of Miami reports they re-powered the 73-ft. yacht *Jebo* with a pair of Gray's, 165 hp., Twin Disc power take-off and 1.5:1 reduction gears, also a 4 kw. Sheppard generating set.

CAMINONES-Y-EQUIPOS PISADOAS, Havana, Cuba received 2 TD14 International tractors for road construction from Liss Equipment Co. of Miami.

SHRIMP BOAT *Eve* with a Caterpillar 120 hp. and Snow-Nabstedt reduction gears, stopped at Jones Ship Yard for engine room repairs before heading for Key West.

A CUMMINS model NHMS, 275 hp., for the shrimp boat of Harry Sawman Fish Co., Fernandina, Fla.; with a Woodward governor and Capital 3:1 gears. Jacksonville branch of Cummins Diesel of Florida handled this fine job.

DIESEL TEAM WORK, we call it; the tug *Eva* pushing 3 barges of sand and gravel under a stalled drawbridge, with the tug *Fredrick* pulling the load on the other side. Being too high neither tug could maneuver under the bridge. Both have Caterpillar 80 hp. diesels and Snow-Nabstedt reduction gears.

TWENTY CUMMINS powered White buses for the Jacksonville Transit Co., model 1154 with seating capacity for 54 passengers, 200 hp. model NHH 600 pancake type with Westinghouse air-brakes. Supplied by Nolan Brown of Jacksonville.

FOR LATIN AMERICA, one Caterpillar #12 road grader to Port Aurrice, Haiti, and Caterpillar tractor parts for Haytian Tractor and Equipment Co., Fort Liberté, Haiti. Several Caterpillar tractors to West India General Store, Inagua, Bahama Islands. All on the MV *Wissana* and MV *Air Polver*; W. E. Johnson, P. and O. docks, handled the shipping details.

DIESEL ENGINE SALES CO. of St. Augustine, "Builders of Fine Shrimp Boats," has opened a branch yard in Fort Meyers with Mr. S. C. Pritchard as general manager. This firm has built almost 300 of the finest shrimp boats afloat. The new yard was needed because of the gigantic shrimp fleet now berthed in this area.

OLD TIMERS PROMOTED at Seaboard RR.

Election of John W. Smith as President and Legh R. Powell Jr. as Chairman of the Board of Directors, puts Seaboard's leadership in the hands of a pair with a combined company service of 78 years. Mr. Powell has worked for the Seaboard line since 1902, starting as a clerk. In 1927 at the age of 43 he became the youngest president of any major railroad. Mr. Smith, who succeeds Powell as president, started in the engineering department in 1924 after his graduation from the University of Maryland, rising steadily to his present position.

### New Flexible Hose

Uniflex, a flexible bronze metal hose that is both seamless and pressure tight, is being produced by

Titeflex, Inc., Newark, New Jersey, at its Springfield, Massachusetts plant. This is in addition to Titeflex's regular line of standard flexible metal hose. Developed primarily for conveying liquids or gases while withstanding high temperatures, corrosion, and abrasion, Uniflex is also an ideal vibration eliminator. Fabricated by a new method, this hose of helical construction distributes the flexing between the inner and outer convolutions, thus allowing greater flexibility and longer life. For additional safety, Uniflex is also produced with a covering of one or more layers of tensile bronze wire braid. Largest customers are in the industrial, chemical, aviation and automotive fields; for steam lines, pressure lines and vibration eliminators.



**D-X DHD MOTOR OIL**

**Stands Up Longer on Rugged Diesel Duty**

Operators of all types of Diesels are discovering that D-X DHD Motor Oil is a tougher, safer, more economical heavy-duty oil to use. It provides higher resistance to heat, foaming and sludge formation. It keeps Diesels cleaner and helps them operate with lower fuel and maintenance costs. Try D-X DHD Motor Oil on a positive money-back guarantee of satisfaction.

**FREE INDUSTRIAL LUBRICATION ENGINEERING SERVICE**

The D-X line of industrial lubricants is complete with a product for every need. If you are located in the Middle West, ask for the help of a D-X Lubrication Engineer in solving your problems. No obligation.

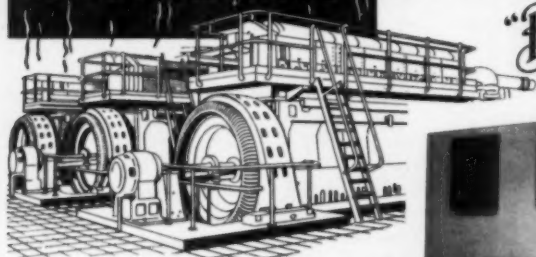
**MID-CONTINENT PETROLEUM CORPORATION**  
TULSA, OKLA.

Waterloo, Ia.    Terre Haute, Ind.    Omaha, Nebr.    Chicago, Ill.    Minneapolis, Minn.

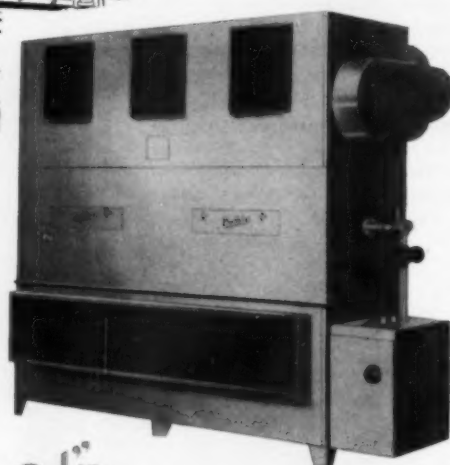
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OVERHEATING**

**GET Dependable  
DIESEL COOLING with**

*"Buffalo"* **EVAPORATIVE  
COOLERS**



Keep jacket water temperature under control, and you get better efficiency from fuel and lubricants, to say nothing of lengthening engine life. "Buffalo" Evaporative Coolers do just this—do it in minimum installation space—use very little spray water. They have all quality parts: (1) "Buffalo" Fans, Pumps, and spray nozzles, (2) Aerofin spiral fin coils, and (3) sectionalized standardized construction which permits easy assembly, installation and maintenance. REQUEST ENGINEERING BULLETIN 3666 and look into these compact, dependable, money-saving coolers!



**BUFFALO FORGE COMPANY**

536 BROADWAY

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

EVAPORATIVE COOLERS AND AXIAL FLOW FANS FOR COOLING MOBILE AND STATIONARY DIESELS

**REDUCE YOUR ATOMIZER REPAIR BILL BY 95%**

*In 5 minutes*



**recondition**

**FUEL INJECTOR NOZZLES  
AND NEEDLES!**

**MERLIN**

**SERVICE MASTER**

Machines will do this work to manufacturers' original standards and reduce your atomizer repair bills by 95%. The Merlin Service Master will grind a point dead concentric with another portion and retain a predetermined angle to within a minute of a degree. It is the first and only machine for these operations. Designed for use in your own shop! Full details from Dept. DP.



Concessionaires  
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Sole Manufacturers  
and Patentees

**THE MERLIN ENGINEERING CO. LTD. - Hebble Mills, Salterhebble, Halifax, England**

## Deutz Air-Cooled Diesels

Klockner-Humboldt-Deutz AG, Koln, Germany are offering, through Diesel Energy Corp., New York, exclusive agents for the United States, a line of Deutz air-cooled diesels for trucks, buses, contractors' equipment, generating sets, general power and marine applications. Deutz, one of the oldest builders of diesel engines, started development of the air-cooled diesel in 1935 and by 1942 had produced a 70 hp. engine that passed severe tests in ambient temperatures ranging from minus 40 degrees to plus 140 degrees F. Over a thousand of these engines were installed in Magirus trucks during 1943-44.

The line of Deutz air-cooled diesels now includes two general models, the FL 514/614 and the AL 514/614. The FL 514 is offered in five in-line versions from 1 to 6 cylinders, ranging from 15 hp. to 120/130 hp. and the FL 614 in two V-type units, 6 and 8 cylinders of 120/130 hp. and 160/175 hp. respectively. The AL 514 group also includes five in-line units, one to 6 cylinders, of 12.5 hp. to 75 hp., and the AL 614's are V-type engines, 6 and 8 cylinders, 75 and 100 hp.

The cylinders are independent units, ribbed and fitted with light alloy heads, the assembly being held in place by through bolts. An axial type blower driven by two V-belts off the crankshaft handles the cooling. A lube oil cooler is also fitted. The four-cylinder engine has a swept volume of 325.45 cu. in. and at 2300 rpm. its output is 82/90 hp. Its weight, fully equipped, is 925 lbs.

The cylinder heads are liberally ribbed for cooling, and are made of heat-resisting aluminum alloy with grey iron turbulence chambers cast integrally with the heads. Pistons are light alloy fitted with three compression rings and two oil rings. The axial-flow blower delivers the required volume of cooling air with a minimum of air noise and an automatic signal warns of any failure of the blower drive. The engines are fitted with Bosch fuel pumps.

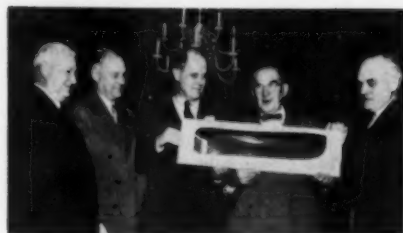
## Manages Chicago Office

Aeroquip Corporation, Jackson, Michigan, manufacturer of flexible hose lines and self-sealing couplings, announces the appointment of Byron E. Snow as manager of the company's new Chicago office, 1033 South Boulevard, Oak Park, Illinois. Mr. Snow has been affiliated with the company in one capacity or another since 1943. For the past two years, he has acted as sales engineer in the Chicago area. The Chicago office will be Aeroquip's headquarters for Northern Illinois, Southern Wisconsin and the state of Iowa.



**DIESEL PROGRESS**

## Fifth Lehigh Valley RR Tug



At a luncheon following the launching of Lehigh Valley Railroad's newest Cleveland Diesel electric-powered tug, *Capmoore*, are, left to right, George W. Codrington, vice president of General Motors and general manager of the Cleveland Diesel Engine Division; Irving D. Jakobson, Jakobson Ship Yard; C. A. Major, president of Lehigh Valley Railroad; Captain Charles Moore, superintendent of Marine Division of the Lehigh Valley Railroad, holding a drawing of the hull and for whom the tug was named; and James Swift, general manager of the Lehigh Valley Railroad.

Louis J. Garday

The fifth Lehigh Valley Railroad diesel electric-powered tug, equipped with a Cleveland Diesel 16-cylinder, 2-cycle 1600 bhp. generator unit, slid down the ways at the Jakobson Ship Yard in Oyster Bay, Long Island, recently. The tug is named *Capmoore*, in honor of Charles M. Moore, superintendent of the Lehigh Valley's marine department, and was christened by Mrs. Moore. Present at the launching were Lehigh Valley president C. A. Major; George W. Codrington, vice president of General Motors and general manager of the Cleveland Diesel Engine division; vice presidents John Duffy and W. F. Gleeson, and general manager J. J. Swift, of the Lehigh Valley Railroad.

The Cleveland Diesel unit provides power for a 1350 shp. electric propulsion motor. The tug is 106 feet long, with 26 ft. molded breadth and 14 ft. 4 in. mean draft, and will be used for towing carfloats, lighters, and other marine equipment between the Lehigh Valley Terminal at Jersey City and various piers and railroad interchange points in the New York area. Previously four other Lehigh Valley tugs, all equipped with Cleveland Diesel electric power, were completed at the same shipyard and are all in service in the New York area.

## Indonesia Purchases Diesels

A \$6,000,000 order for 27 diesel-electric locomotives has been placed with International General Electric Company, Inc., by the Indonesia State Railways, it has been announced. The locomotives are expected to aid Indonesia's economy by providing better rail transportation for the country's rubber and tin exports. The 1,600 horsepower locomotives, which will be used for passenger as well as freight service, are being built at the G-E Erie, Pa. Works. The first units are scheduled for completion in January, 1953. The purchase was made with funds from the \$100,000,000 Export-Import Bank loan granted Indonesia last year.

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MARCH 1952

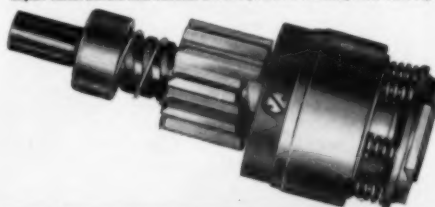
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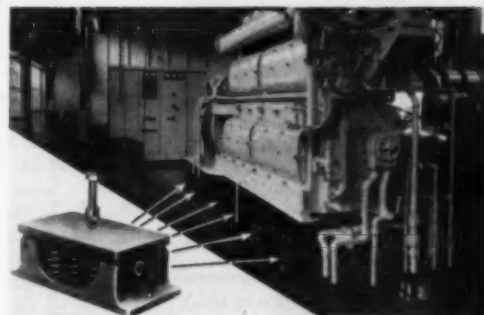
This makes it possible to install diesels anywhere with positive assurance that there will be absolutely no transmission of objectionable vibration. Additional benefits include savings from reduction of building and engine maintenance costs, and frequently the elimination of concrete foundations.

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This Alco 975 hp. six cylinder turbocharged main generating unit installed on a mooring barge operated by U.S. Army Corps of Engineers, Memphis District, supplies power for their new dragline bank graders. The unit is mounted on Korfund vibro-isolators for smooth operation, and to prevent bearing misalignment due to hull distortion.

### A Few Typical Installations:

Bangor Hydro-Electric Co., Bangor, Me.	1425-hp. Wardberg
Lenox Hill Hospital, New York	1 730-hp. Worthington
2 Park Avenue, New York	4 450-hp. 1 750-hp. Worthington
New Yorker Hotel, New York	1 530-hp. 1 750-hp. Bosch-Sulzer
Kamm Department Store, Brooklyn	4 300-hp. 1 180-hp. 1 150-hp. Worthington
Macy's, New York	1 700-hp. Alco
Floyd Bennett Field, New York	1 450-hp. Fairbanks-Morse
Prudential Insurance Co., Newark, N. J.	1 740-hp. Baldwin
Loose Star Gas Co., Dallas, Texas	1 400-hp. Cooper-Bessmer (Gas)
Sea Oil Co., Marcus Hook, Pa.	4 250-hp. Ingersoll-Rand (Gas)
Cia Central Argentina de Electricidad, Buenos Aires, S. A.	1 270-hp. Sulzer; 2 540-hp.; 1 580-hp.; 1 700-hp. Sulzer

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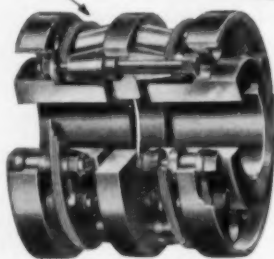
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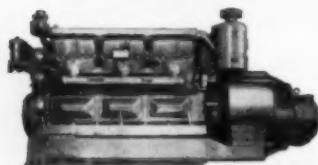
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## REPORT ON CHEVRON STARTING FLUID

Since Chevron starting fluid was first made available to the public three years ago by The California Oil Company, millions and millions of red gelatin capsules have given fast starts to thousands of diesel and gasoline motored equipment owners in temperatures ranging from 40°F. above zero to fifty below. Results of a survey of capsule performance conducted by the company in the United States have shown that Chevron starting fluid is saving heavy equipment operators, hundreds of thousands of dollars in starting time, engine and equipment wear and tear, and batteries.



The survey also revealed that the product, due to its successful performance, is now in greater demand by owners and operators of heavy equipment than ever before. Forecasting record sales for the cold months of 1951-52, C. J. Moody, vice president of The California Oil Company, predicts that the number of capsules sold will reach a new high. The Chevron starting fluid capsule was perfected by The California Oil Company, eastern marketing subsidiary of Standard Oil Company of California, at Barber, N.J. Inserted into a holder installed on or near the dash board, the capsule is pierced by a puncturing tool, and its fluid released and injected into the intake air manifold system through an engine primer. The priming system was also developed and is distributed by the company.

Heavy equipment owners and operators were asked for information on performance of the capsules. To make answering easier, and insure returns, questionnaires with spaces for replies, were printed on the reverse side of stamped, self-addressed postal cards. Questions asked were (1) Kind of equipment, (2) Type of business, (3) Approximate number of units equipped for Chevron starting fluid, (4) Size of capsules used (7 CC-17 CC), (5) Approximate number of capsules used per average start, and (6) Estimated savings in lost time, wear and tear on equipment, batteries, etc. In addition to the questions, there was space at the foot of the cards for further comments. Of the heavy equipment owners and operators who

returned the cards, praise for the capsules was almost unanimous. Butler Sand Service, Portland, Conn., operating shovels and bulldozers, wrote, "Until we used capsules, we wasted many valuable hours trying to start our equipment with battery boosters and blow torches in cold weather."



"Could exceed \$15,000 per season in lost working time alone. Wear and tear savings are incalculable," writes a coal stripping firm from Scranton, Pa. Harry A. Maul of the Mt. Ephraim Service Center in New Jersey replies he thinks so well of Chevron capsules that he will not send out a mechanic on a job without them. In twenty below zero weather at Houtzdale, Pa., the Central Moshannon Coal Company reports that the capsules have proved valuable in battery started equipment. Trucks start in a matter of seconds. A lumber business operator in the same area confirms the report, writing, "If it were not for Chevron, it would be impossible to start motors in winter. Saves time and wear on batteries and motors."

### Booklet Available

Colored photographs of various kinds of Cummins-powered equipment, shown at work in construction, logging and transportation, have been collected and published in a miniature album by Watson & Meehan. The Northern California and Nevada distributor of Cummins Diesel Engines calls its novel booklet "Winning the West with Power." Equipment photographed to illustrate the story of the contribution Cummins Diesels have made in developing the West belongs to the following California firms: Santa Cruz Lumber Company, Santa Cruz; Walter G. Brix, Inc., Briceland; Crane Mills, Corning; Wooldridge Manufacturing Company, Sunnyvale; Coca Cola Bottling Company, Fresno; Guy F. Atkinson Company, Ben C. Kerwick, Inc., International Engineering Company, Matson Navigation Company, and White Motor Truck Company, all of San Francisco. Copies of the album may be obtained by writing Watson & Meehan, 1960 Folsom Street, San Francisco, California.

## Buys Chicago Dealership Interest



Raymond H. Snyder

Raymond H. Snyder, former president and treasurer, Snyder Aircraft Division, Air Associates, Chicago, has purchased certain assets of the Chicago operation of Cummins Diesel Sales Corporation. L. W. Beck, Vice President-Sales, Cummins Engine Company, Inc., Columbus, in making the announcement said that Mr. Snyder will operate the Chicago facilities as an independently owned Cummins dealership with the new company name of Cummins Illinois Engines Sales, Inc. Headquarters for Cummins Illinois Engine Sales, Inc., will remain at 1700 South Indiana Avenue, Chicago. The territory assigned the new company includes the 22 counties of Northern Illinois; Scott County, Iowa; and Lake, Porter and La Porte counties in Northern Indiana. Mr. Snyder joins the Cummins dealership organization after more than two decades of experience in the aircraft engine and supply industry. He is a native of Ohio, calls Western Springs, Illinois (a Chicago suburban community) his home town, is married and has two children. Mr. Beck also announced that the operations at Milwaukee, Wisconsin and Peoria, Illinois, formerly with headquarters at the Chicago dealership, now will operate as individual dealerships of Cummins Diesel Sales Corporation.



## Will Open New Branch

Stewart & Stevenson Services, distributors of General Motors diesel engines, has been given an extension of their GM distributor franchise to include the West Texas and Eastern New Mexico area and will soon open a new sales and service branch on the Midland-Odessa highway. Joe Manning, vice-president and general manager announced recently. Stewart & Stevenson Services now serves all industry throughout Texas. E. E. (Slim) Childress, former oil industry equipment salesman in the Houston area for Stewart & Stevenson Services, has been named district manager for the new operation. Harold Whitely, formerly with the Empire Machinery Company, will be the parts manager at the new West Texas store.

"Stewart & Stevenson Services pioneered the General Motors diesel engine in Texas," Mr. Manning said. "It is our aim in serving the West Texas and Eastern New Mexico areas to put the full facilities of our organization behind this operation in order to bring to power users in this area the many tried and proven service principles which have made it possible for Stewart & Stevenson Services to reach top rank in the diesel engine field." The new Stewart & Stevenson West Texas branch will be located on the Midland-Odessa highway, seven miles east of Odessa. A direct telephone will be established to both Midland and Odessa.

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## For Dutch Guiana Operation



The 55 ft. twin screw towboat *Rorac* pictured above was built for the Surinaamsche Bauxite Maatschappij of Dutch Guiana by the Equitable Equipment Co., Inc., 410 Camp Street, New Orleans, La. The vessel was designed by Friede and Goldman, naval architects. Hull dimensions are 55-ft. long by 18-ft. beam by 7-ft. depth. Main engines are two 256 hp. Caterpillar D364 diesels which provide a total shaft horsepower of 512. Propellers are Columbian bronze 52 inch diameter by 32 inch pitch. The engine room auxiliaries consist of a 5 kw., 100 volt dc. diesel engine driven generator set. The controls for the engines are adjacent to the steering station. Westinghouse air brake controls have been provided for the clutches and Caterpillar throttle controls have been installed. The entire operation of the towboat while under way can be carried on from the steering station in the pilothouse. This *Rorac* type vessel has been added to Equitable's line of standard tugs, water taxis, barges and shallow draft towboats.

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## Inland River Reports

By DAVID I. DAY

THE DYED-IN-THE-WOOL Cooper-Bessemer fans on the upper Ohio were singing even more loudly the praises of the 13-year-old *Patriot* of the American Barge Line also and completed also in the Jeffboat yards. The *Patriot* is one of the busiest boats on the Ohio above Cincinnati this winter. When we saw her along early in the month she had several barges of sulphur, benzol, and steel and Capt. Frank A. Phipps was in charge. She has about 1600 to 2000 hp.

WE SAW the new M.V. *Hortense B. Ingram* recently below Memphis, Tenn., on the Mississippi headed for Houston, Texas, on what we believe was her maiden trip. The vessel came off the ways in January at the yards of the Nashville Bridge Co., and was delivered with the customary ceremonies to the owner, the Ingram Products Co. The boat is 124 x 27.6 x 10.6 and is powered by General Motors (Cleveland) twins totaling 1800 hp.

FOR THE FIRST time in years, we noted the busy *Tri-State* of the Ashland Oil fleet, first radar-equipped boat on the inland waterways, pushing her tow from Sistersville, West Virginia, on the upper Ohio River. The famous pusher was behind six loaded gasoline barges and six loaded ones with crude oil.

THE \$8,000,000 expansion program of the plant owned by the Columbia-Southern Chemical Co. at Natrium, West Virginia, on the upper Ohio is actively under way which means more chlorine, caustic soda, and other chemicals will move by river. The work is being done by the diesel boats of the Union Barge Line, the American Barge Line and the Mississippi Valley Barge Line.

UPBOUND AT Gallipolis, Ohio on the Ohio was the old Illinois River stand-by of the Ohio River Company, the *Henry B. Sturgis*. She will remain in the Ohio River coal trade until spring. At the time we glimpsed her she was making fine time pushing five big barges of coal. Capt. Edgar (Jocko) Meek is in command with Capt. C. R. (Bud) Hutchinson, the Illinois River pilot, turning the "knowledge box" over to Capt. C. W. Elder.


ANOTHER OLD-TIMER leading the towing parade on the Ohio this winter is the *Ernest T. Weir*, 11 years old, seen in late January pushing 13 barges of steel with some gas barges and a few empties for full measure. August Dermotta, one of the river's most widely known diesel engineers, is in charge of the *Weir's* engine room. The master is Capt. W. L. Keeton. In the pilot house we saw Capt. William Jackson. The boat has Superior engines, twins totaling about 1600 horsepower.

CONGRATULATIONS TO the owners of the very speedy M.V. *Sarah Kate* of the Hill City Towing Co., seen passing Cincinnati behind 42,000 barrels of oil. This towboat came from the Vicksburg yards in 1950. She is powered by twin General Motors with a conservative rating of 1800 hp.

THE DIESEL VESSEL *Pennsylvania* of the Union Barge Line, Pittsburgh, was one of the busiest boats on the upper Ohio while we were on the January trip—busy in the chemicals trade, in handling steel, with occasional room for barges of miscellaneous freight. We passed her twice, once as she towed a couple of barges of chlorine and again as she pushed in addition to chemicals a number of big steel barges and some empties. In command was Capt. Louis Althoff. The boat has two Superior diesels totaling 2000 hp., using Kort Nozzles.

NOTHING IS MORE inspiring in up-river action now afloat than the lovely *Susan Hougland*, of the Walter Hougland fleet of Paducah, Ky. This 3200 hp. boat has twin General Motors diesels and was built at the Nashville Bridge Co. yards. She usually brings 11,000 tons at a time. Capt. W. L. Bachuss has been in command of the *Susan* for a good while.

AS THE *Mount Vernon* of the American Barge Line drove through high water in the general direction of Pittsburgh, tourists near Clarrington, Ohio were taking pictures of her through the hazy air with expensive-looking cameras. While she had a tow of varied origin in January—oil, sulphur, scrap, and a flock of empties we have observed her a number of times with a straight oil load of 115,000 barrels. She was built by the Jeffersonville Boat & Machine Co., Jeffersonville, Indiana and has triple screws. Her engines are Cooper-Bessemer.

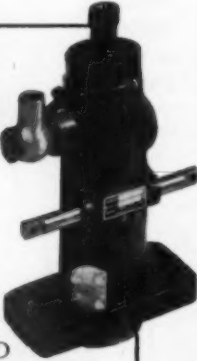



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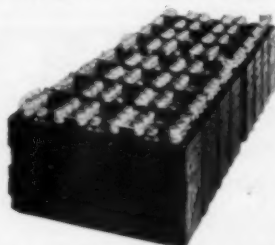
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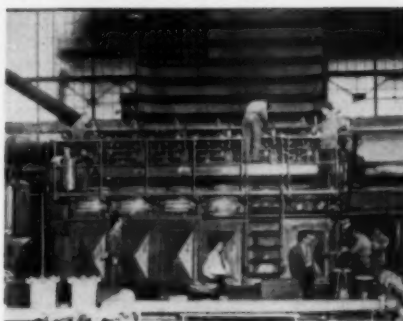
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### Dual Fuel Hamilton Engine



Final tests of a 2900-hp. Hamilton dual fuel diesel engine were observed recently by Mr. Leo Kollaja, chief engineer of the Municipal Electric plant at Robstown, Texas, on the test floor of Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio. The engine is a Model 21-SA, 2-cycle, 21 1/2-in. bore, 27 1/2-in. stroke, 6 cylinders, running at 257 rpm. and rated at 2050 kw. During tests the engine operated on the diesel cycle with natural gas and pilot fuel oil for ignition. An important feature of the engine is a rotary valve which increases air entrainment for combustion by 40 per cent and gives a high power capacity without increasing pressures or peak temperatures. When installed at Robstown, Texas, Mr. Kollaja plans to operate the engine on dual fuel principally as the base load unit for the city's electric supply. The new Hamilton engine will increase the power capacity of the Robstown plant by more than 70 per cent over the total rated power of the present six gas engines in use there.

### Compressor Authority Retires

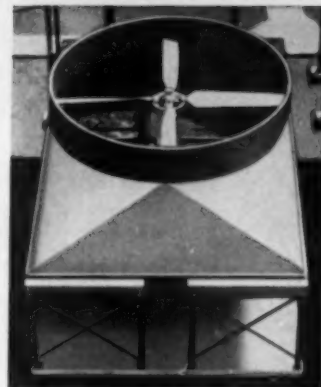


Herman H. Miller

Herman H. Miller, one of the country's leading compressor authorities, retired recently after serving 50 years with Worthington Pump and Machinery Corporation. In 1901, as an application engineer, he joined the Laidlaw-Dunn-Gordon Company of Cincinnati, Ohio, a subsidiary of International Steam Pump Company, which later became the Worthington Pump and Machinery Corporation. Ten years later he became manager of the Air Compressor Department of Worthington's New York office and in 1915 became sales manager of Worthington's Cincinnati plant. In 1932 he was made manager of the Compressor Division of Worthington when the Company's Cincinnati plant was consolidated with the Buffalo plant.

Mr. Miller, who has traveled extensively throughout the United States to supervise installations of compressors, has also been a prolific writer on the subject of compressor applications in various Worthington publications. He is a member of the American Society of Mechanical Engineers of 25 years standing and the Buffalo Athletic Club. Asked about his future plans, he glanced out at the cold winter scene and remarked, "Guess I'll spend my winters in Florida and devote some time to flower gardening."

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## West Coast Diesel News

By FRED M. BURT

**CORRECTION**—The news item concerning North Jones joining Industrial Engine Service, Inc., Los Angeles as a junior partner, in this news column, February issue, was in the nature of a hoax perpetrated by phone on this writer, by a person falsely identifying himself as an officer of the company, for reasons unknown. Mr. Jones' relations with the company are solely those of factory representative of Murphy Diesel Co.

THE LOCOMOTIVE Firebox Company, Chicago, Ill., has recently been appointed by Hallett Manufacturing Company, as their railroad sales representative for the small air-cooled Hallett diesel generating sets such as are used in cabooses to supply power for train radios. Also Charles W. Schaub, with headquarters in Jacksonville, Florida, has been appointed factory sales engineer for the Coastal States from Maine to Texas.

**PURCHASED BY** Berg Metals Company, Los Angeles, from Shepherd Tractor and Equipment Company three 35-hp. Caterpillar diesels to drive 15-kw. dc. generators to supply current for scrap-handling magnets on Brown Hoist cranes which had previously been converted from steam-power to use of 125-hp. "Cat" diesels, with Twin Disc torque converters.

**FROM** Cooper-Bessemer Corp., Seattle branch, for Jim Creek Naval Transmitter Station, diesel-electric generating sets, three Cooper-Bessemer 1000-kw. units, two 600-kw. units.

**TO RE-POWER** a fleet of seven LeTourneau Super C Tournapull used in earth-moving operations in San Diego and Mojave areas, T. M. Page Corp., Monrovia, Calif., contractors, have purchased Model 6DA-844, 215-hp. Buda diesel engines from Buda Engine & Equip. Co., Los Angeles.

**INSTALLED BY** Macco Corp., Paramount, Calif., a 6-cyl., 280-hp. supercharged Buda diesel engine, in a Sterling truck chassis to carry a 5,000 gal. water tank, for use on the Isabella Dam project near Bakersfield.

**FOR** Bell and Burden, Inc., oil well drilling contractors of Los Angeles, to power a Mid-Continent rig in the Ventura oil field four, 6-cyl., 315-hp. Cummins natural gas engines; serviced by Cummins Service and Sales.

**RECENTLY COMPLETED** at Harbor Boat Yards, Vancouver, B.C., for Capt. Joe Katnich, salmon seiner 72 ft. *Northview*; powered with a 270-hp. Caterpillar diesel.

THE AMERICAN Smelting and Refining Company has installed four new 615-hp. Worthington supercharged diesels in one of their Mexican mining operations. The diesels use a low grade of Mexican diesel oil which is heated by steam from the Vapor-Phase system used in place of radiators on the diesels; this low pressure steam from waste heat is also used for water- and space-heating in the men's locker room.

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PURCHASED BY the Mahoney-Morrison Company, Sunland, California contractors, from Smith-Booth-Usher Company, Los Angeles, a TD-14 International diesel tractor equipped with a Bucyrus-Erie bulldozer for use in cleaning up areas recently flooded.

TO RE-POWER A Northwest Model 6 Crane at the Southern Pacific Railway shops in Oakland, replacing a gasoline engine, a Murphy 140-hp. diesel engine was purchased from Oswald Machine Works, Murphy distributor in San Francisco.

FROM HALLETT MANUFACTURING CO., Inglewood, Calif., 44 5-hp., 1-cyl., air-cooled Hallett diesel engines for installation by New England Trawler Company, Boston, in deck-mounted winches on military vessels.

FOR CONTINENTAL Oil Company's Wyoming operations, three 75-kw. General Motors diesel sets at Circle Ridge and two 60-kw. GM sets at Maverick Springs. Each set of power units is equipped with Engineering Control's Vapor Phase units to replace radiators for engine cooling and to use waste heat for heating the power house building in the winter, with conversion to a cooling system in the summer.

APPOINTED AS Field Service Engineer in Southern California for Cummins Service and Sales, Los Angeles, Fritz Engel brings to the job many years of association with Cummins engines, the last six years of which has been with this distributor. He will assist Cummins diesel engine users in keeping their diesels in prime operating condition.

A NEW Union 750-hp. diesel marine engine for the Reliance Towing Company, Vancouver, B.C., has recently been delivered for a new tug under construction at the Benson Shipyard in Vancouver. Trial scheduled for spring of 1952.

FOR TAYLOR RANCHES, Chino, Calif., one of the largest alfalfa growers in California, a 75-hp. P&H diesel from Engine Sales and Service to power a 5-inch pump to supply water for a portable overhead irrigation sprinkling system covering about 750 acres.

AUSTIN SHERMAN, President of Hallett Mfg. Co., Inglewood, left February 1st, for a two months trip calling on Hallett diesel distributors in the Caribbean Sea area, and to Central and South American countries.

THE FIRST shipment to apply on order for 500 6-cyl. 135-hp. P&H diesels to power portable Pioneer rock-crushing plants for various military airfields in the Pacific theatre have arrived at Port Hueneme, Calif. These units are serviced before shipment by engineers from Engine Sales and Service, Los Angeles.

DIESEL ENGINE CATALOG is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from DIESEL PROGRESS, P.O. Box 8458, Cole Station, Los Angeles 46, California.

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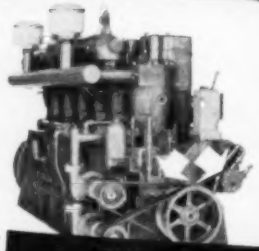
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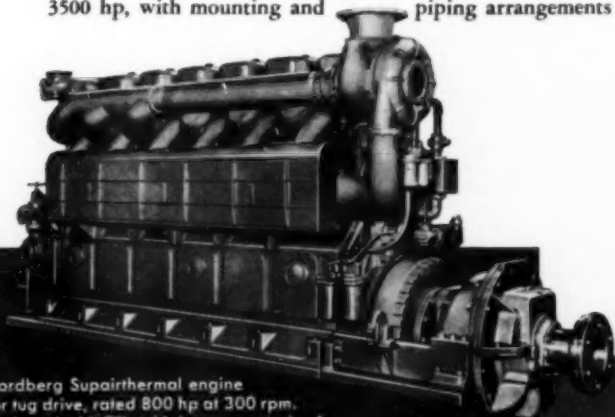
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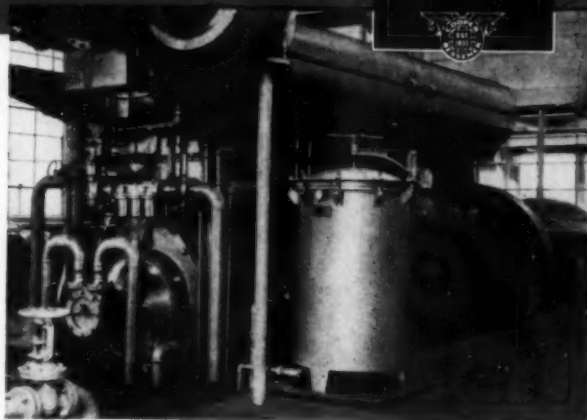
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Cooper-Bessemer LS-8 supercharged gas-diesel, 1,715 hp in Mid-Valley Clarkson station. Line will soon have 15 LS-8's, 12 of which are gas-diesel and 3 of which are diesels, plus 9 JS-8 supercharged gas-diesels.

Map of Mid-Valley Pipe Line Company's 1000-mile system including new stations and station expansions.

- ◆ Original Cooper-Bessemer power stations
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